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(54) Titre : SIEGE ABSORBANT LES CHOCS AVEC ELEMENTS D'AMORTISSEMENT
(54) Title: SHOCK-ABSORBING SEAT HAVING DAMPING MEMBERS

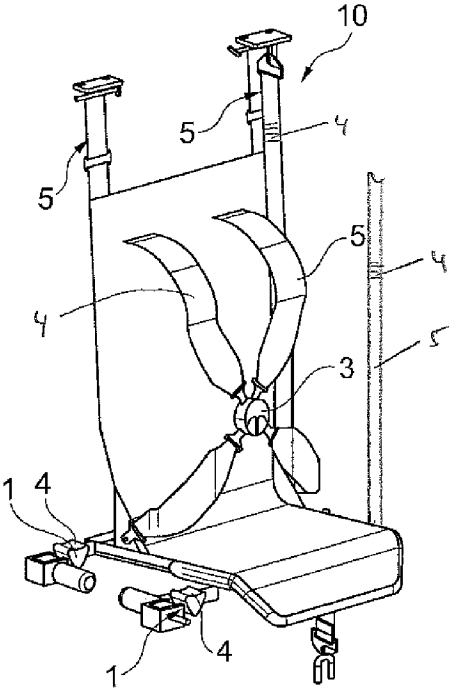


Fig. II.3

(57) Abrégé/Abstract:
A damping member (1) which has at least two engagement points (2), wherein the damping member (1) has an absorption means, wherein fastening elements (3) are arranged on the damping member (1), and wherein an additional absorption means (4) is provided which brings about shock absorption together with the absorption means.

Abstract

A damping member (1) which has at least two engagement points (2), wherein the damping member (1) has an absorption means, wherein fastening elements (3) are arranged on the damping member (1), and wherein an additional absorption means (4) is provided which brings about shock absorption together with the absorption means.

DESCRIPTION

Shock-absorbing seat having damping members

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.

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, 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.

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 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.

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.

In a particular embodiment, the fastening elements are designed as tubes. These can then be arranged by insertion into existing tubes of a seat and/or of the chassis of a vehicle. For the purpose of fixing the tubes, it is then proposed to provide holes in the tubes which are fixed by means of screw or plug connections.

Fixing in this way or design as a plug-connectible tube system has the advantage of quick exchangeability. Accordingly, the damping members can also be used as replacement parts.

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.

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

The invention provides an additional absorption means which can likewise absorb forces and therefore contributes to damping. The damping then takes place by way of cooperation between absorption means and additional absorption means.

The additional absorption means absorbs the exerted forces by deformation work. This means that the additional absorption means is deformed during the action of force. However, a deformation of this kind does not occur in the event of conventional loading and/or action of force on the damping member. Said loading or action of force is converted into deformation work only when a certain force is exceeded. As a result, the shape is retained in the event of normal loading of the damping member.

In a particular embodiment, the damping member has a housing which can have different shapes. It is proposed here to arrange absorption means within the housing. The additional absorption means can then be the housing or a part of the housing.

In order to assist deformation of the housing or of parts of the housing, the parts of the housing which are intended to deform are provided with round shapes. Therefore, a heart or cloverleaf shape is preferably proposed for the housing since these shapes have proven particularly suitable for a corresponding deformation.

In a further 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 is of multilayered design at least in regions. In this case, the additional absorption means consists of seams which connect at least two layers of the strap to one another. The possible deformation work of the additional absorption means takes effect here owing to the separation of the seams in the event of action of force.

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 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.

For the purpose of improved force absorption, the invention further preferably proposes arranging the engagement points offset in relation to one another, so that they are not in alignment. This has the advantage that, in the event of an action of force at the engagement points, the fastening elements can move in the direction of the damping member, without impeding one another.

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. Similarly, the movement of a person in the seat can be damped by the damping members.

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 equipped with corresponding straps. A combination of the abovementioned arrangements is also conceivable.

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

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

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 the shape of a heart

figure I.6: shows a damping member according to the invention in the form of a strap

figure II: shows a seat according to the invention having damping members and a lateral suspension arrangement

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

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

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

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

figure II.5: shows a damping member according to the invention in the shape of a heart

figure II.6: shows a damping member according to the invention in the form of a strap

figure II.7 shows seams on a damping member according to the invention in the form of a strap

figure III: shows a seat according to the invention having damping members and mounted on the chassis of a vehicle

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

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

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

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

figure III.5: shows a damping member according to the invention in the shape of a cloverleaf

figure III.6: shows a damping member according to the invention in the form of a strap

figure III.7: shows damping members between the seat and the chassis

A damping member 1 which has a housing and is designed approximately in a heart shape when viewed from the side is provided in figure I. A fastening element 3 is arranged at the engagement points 2 on each side of the heart-shaped damping member 1.

The fastening element 3 is preferably of tubular design. The longitudinal axes of the two tubes are vertically offset in relation to one another. The damping member 1 which is of heart-shaped cross section is formed by a metal sheet which surrounds the narrower outer sides and on which the tubes are arranged, in particular welded. The interior of the heart-shaped

damping member 1 is filled with an elastically deformable material which constitutes the absorption means.

The seat 10 is firstly connected to its chassis and secondly to a chassis 11 of the vehicle by means of the two tube ends which protrude from the heart-shaped damping member 1. The tubes could likewise be inserted into existing tubes of the seat and/or of the chassis in order to generate a plug connection. To this end, fixing of the plug connection is rendered possible by means of holes 6 in the tubes that are provided for this purpose. A connection of this kind is shown, for example, in figure I.5.

If there is an impact on the vehicle from the outside, the heart-shaped damping member 1 according to the invention allows the energy of the impact to be absorbed both by way of the deformation of the outer heart-shaped metal sheet (additional absorption means 4) and also of the elastically deformable material (absorption means), which is located in the interior of said metal sheet, in order to reduce the energy of the impact.

A deformation is implemented by way of the two longitudinal axes of the two fastening tubes not being in alignment, but rather vertically offset in relation to one another. This permits the heart-shaped damping member 1 to be telescoped for the purpose of reducing the deformation energy and therefore a considerable attenuation of 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. The person sitting on the seat 10 can strap themselves in using a strap 5 of this kind, but straps can also be connected in an articulated manner to the seat 10 and/or to the chassis of a vehicle in order to damp moving parts of the seat 10. 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 5 forms the damping member 1.

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.

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 II.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 seperated 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.

The strap is designed such that the damping member is not activated under normal conditions or actions of force. The damping member becomes active only starting from a certain loading limit.

Figure I shows a seat of a vehicle, which seat is connected to the seat 10 by means of the heart-shaped damping member 1 by way of tubes or the like which are arranged on it. Secondly, the damping member 1 is likewise connected to a chassis 11, not illustrated, of a vehicle by means of tubes or the like. The illustrated seat 10 is also equipped with the damping member 1 which is integrated in the strap 5. In this illustration, the seat 10, at the rear side, is arranged on the chassis 11 of the vehicle by means of a plurality of heart-shaped damping members 1.

Figure II likewise shows that the heart-shaped damping member 1 and also the damping member 1 which is integrated in the strap 5 are used as damping members 1. However, in this refinement, the seat 10 is not arranged and fastened in the vehicle at the rear side, but rather laterally at a suitable point, by means of the heart-shaped damping members 1.

Figure II.2 shows a particularly preferred arrangement of the damping members 1 which are embodied 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.

Both types of damping members 1 are likewise used in figure III, wherein a cloverleaf-shaped, and not heart-shaped, damping member 1 is used here. This at least one cloverleaf-shaped damping member 1 is arranged between a chassis 11 of the vehicle, for example a floor plate, and a chassis of the seat 10, for example an underside of the sitting surface.

All the figures show that both the heart-shaped and, respectively, cloverleaf-shaped damping member 1 and the damping member 1 which is integrated in the strap 5 are used. The protective effect is considerably increased as a result. Secondly, it is also conceivable for only the heart-shaped damping member 1, only the cloverleaf-shaped damping member 1 or only the damping member 1 which is integrated into the strap 5 to be able to be used in the three representations of the seat 10 shown. The combination of at least one heart-shaped damping member 1 with at least one cloverleaf-shaped damping member 1 can also come into consideration.

As an alternative to the above-described heart-shaped cross section of the damping member 1, a cloverleaf-shaped cross section also comes into consideration, as shown in figure III. A cloverleaf-shaped cross section of this kind of the damping member 1 is then used when it is arranged, for example, between the chassis 11 of the vehicle and the chassis of the seat, so that the fastening tubes which are required in the case of the heart-shaped damping member 1 can be, but do not have to be, dispensed with. Even in the case of a cloverleaf-shaped damping member 1, tubes can be fastened in order therefore to arrange and to fasten the damping member 1 at its installation location.

The invention is not restricted to the abovementioned features. Rather, further refinements are possible. For example, the additional absorption element can be designed as a sleeve around the absorption element. A housing can then additionally be arranged around the two damping elements. Plug connections at the engagement points and/or fastening elements are likewise possible in order to render possible easy replacement of the damping members.

LIST OF REFERENCE SIGNS

1	Damping member
2	Engagement point
3	Fastening element
4	Additional absorption means
5	Strap
6	Hole
10	Seat
11	Chassis

PATENT CLAIMS

Shock-absorbing seat having damping members

1. A damping member (1) which has at least two engagement points (2),
characterized
in that the damping member (1) has an absorption means,
in that fastening elements (3) are arranged on the damping member (1),
and in that an additional absorption means (4) is provided, which additional absorption means, together with the absorption means, provides shock absorption.

2. The damping member (1) as claimed in claim 1, **characterized** in that the absorption means is arranged within the damping member (1).

3. The damping member (1) as claimed in claim 1, **characterized** in that the absorption means is designed as a strap (5).

4. The damping member (1) as claimed in one of claims 1 to 3, **characterized** in that the damping member (1) has a housing.

5. The damping member (1) as claimed in claim 4, **characterized** in that the additional absorption means (4) consists of deformable parts of the housing.

6. The damping member (1) as claimed in one of claims 1 to 5, **characterized** in that the absorption means consists of at least two layers which lie one above the other.

7. The damping member (1) as claimed in claim 6, **characterized** in that the additional absorption means (4) consists of seams which connect at least two layers of the absorption means.

8. The damping member (1) as claimed in claim 6, **characterized** in that the seams run parallel in relation to one another at distances.

9. The damping member (1) as claimed in one of claims 1 to 8, **characterized** in that the engagement points (2) are arranged offset in relation to one another, so that they are not in alignment with one another.

10. The damping member (1) as claimed in one of claims 1 to 9, **characterized** in that the fastening elements (3) are arranged at the engagement points (2).

11. The damping member (1) as claimed in one of claims 1 to 10, **characterized** in that the fastening elements (3) are designed for fastening to tubes.

12. The damping member (1) as claimed in one of claims 1 to 11, **characterized** in that the absorption means consists of an elastically deformable material.

13. The damping member (1) as claimed in one of claims 1 to 12, **characterized** in that the damping member is designed in a heart shape or cloverleaf shape.

14. 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 13.

15. The seat (10) as claimed in claim 14, **characterized** in that the damping member (1) is arranged between the seat (10) and a chassis (11) of the land vehicle.

16. The seat (10) as claimed in either of claims 14 and 15, **characterized** in that the seat (10) comprises at least one strap (5) and the damping member (1) is integrated into the strap (5).

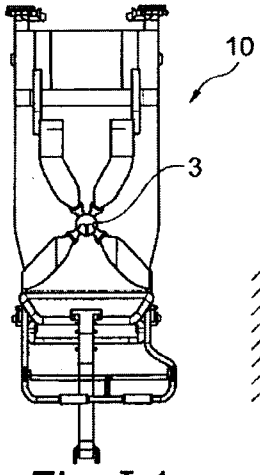


Fig. I.1

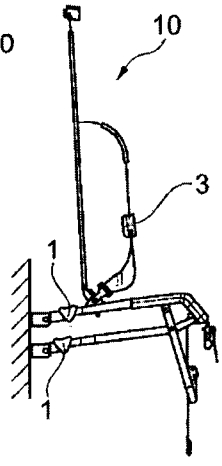


Fig. I.2

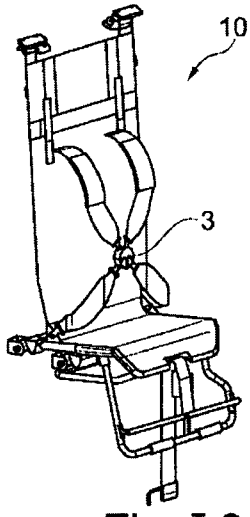


Fig. I.3

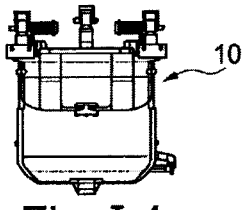


Fig. I.4

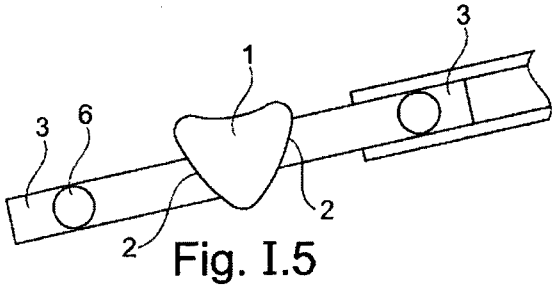


Fig. I.5

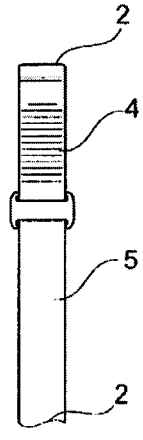


Fig. I.6

Fig. I

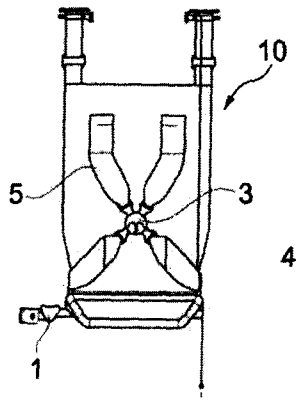
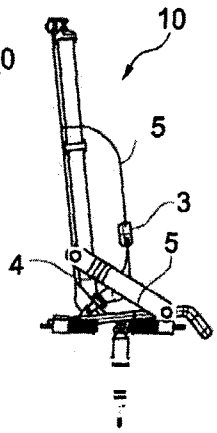


Fig. II.1



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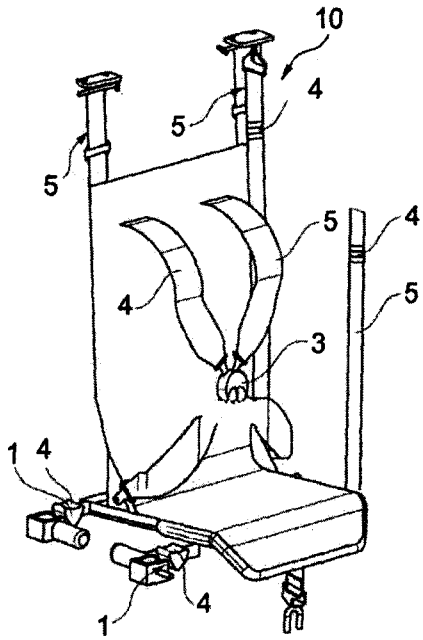

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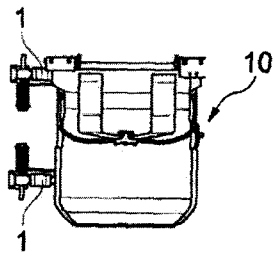

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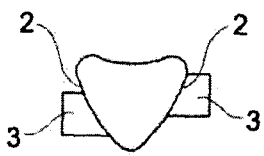

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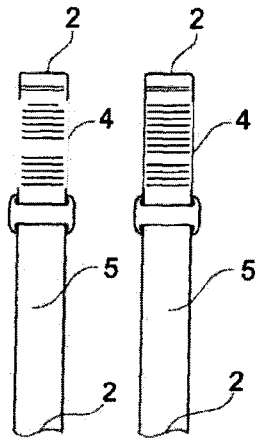

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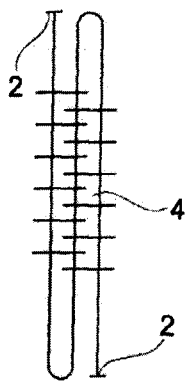


Fig. II.7

Fig. II

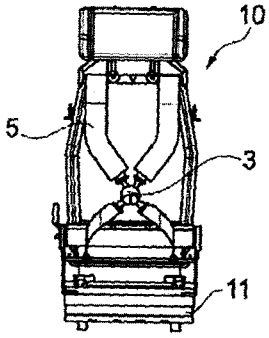


Fig. III.1

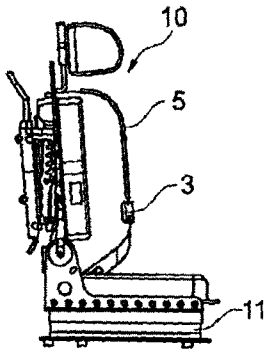


Fig. III.2

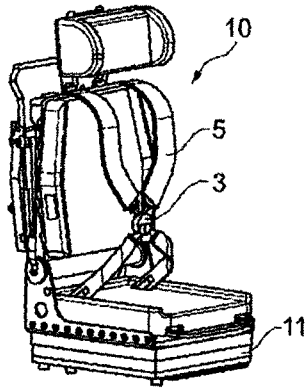


Fig. III.3

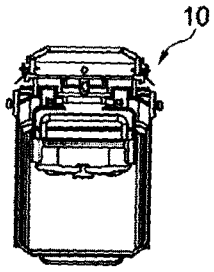


Fig. III.4

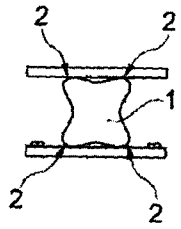
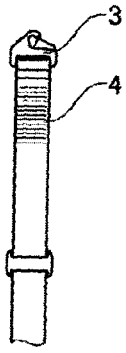


Fig. III.5



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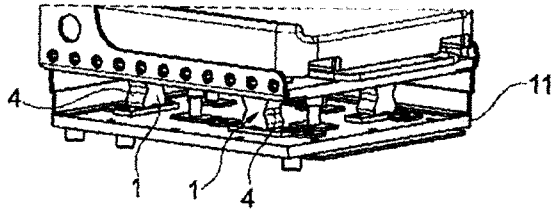

Fig. III.7

Fig. III

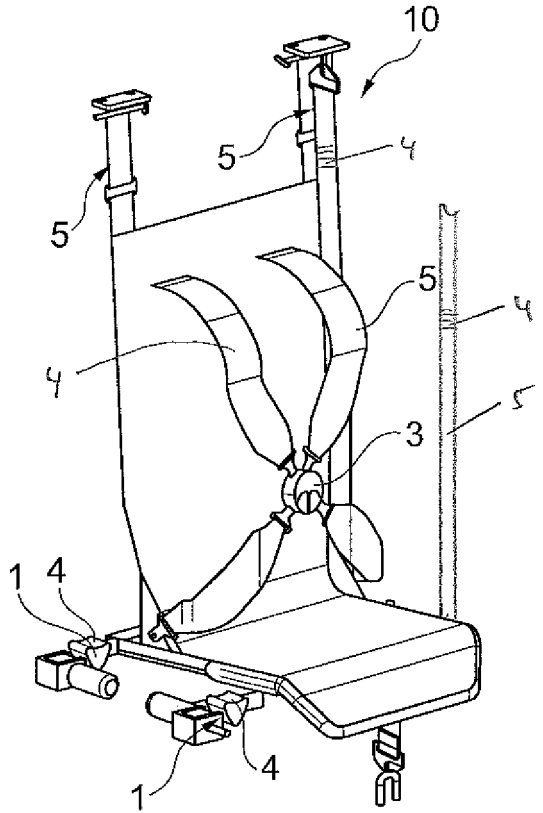

Fig. II.3