(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 824 241 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.01.2015 Bulletin 2015/03

(51) Int Cl.:
E01F 15/04 *(2006.01)*

(21) Application number: **13380029.2**

(22) Date of filing: **11.07.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Barrier for a vehicle restraint system**

(57) The present invention relates to a barrier (1) for a vehicle restraint system, the cross-section of which comprises two straight barrier section sectors (7A, 7B), attached by a stamping (4) located in a central portion of the cross-section and longitudinally traversed by one and the same imaginary axis (y) of the cross-section plane, and two wings (5A, 5B), each of them attached to a barrier section sector (7A, 7B), each wing (5A, 5B) forming an obtuse angle with the barrier section sector (7A, 7B) to which it is attached and both wings (5A, 5B) protruding on the same side of the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B), wherein the stamping (4) has a cross-section with two substantially straight sectors attached to one another by a bend and each sector attached at its other end to a barrier section sector (7A, 7B).

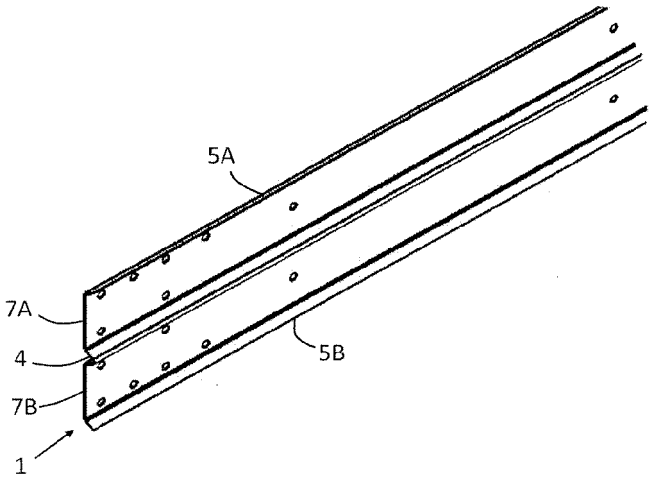

FIG. 4

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Description

Object of the Invention

[0001] The present invention is comprised in the field of the vehicle restraint systems that are installed on the sides of roads as passive safety elements. These systems try to minimize the consequences of accidents in which a vehicle leaves the roadway.

[0002] The present invention proposes a barrier for a restraint system that improves vehicle restraint and redirecting capacity (including heavy vehicles), that is easy to manufacture and further allows the overlapping of barriers and lining the barrier with a cover made of wood, for example.

Background of the Invention

[0003] Different vehicle restraint systems are known in the state of the art, generally including longitudinal elements with a double or triple wave shape. This complex barrier geometry entails manufacturing difficulties, while also complicating stacking barriers and not allowing a plurality of barriers to be overlapped one after the other to strengthen their attachment because they require intermediate elements that do not provide such a firm attachment.

[0004] On the other hand, if the system has to be covered with protective and/or decorative elements, for example wood, the mentioned barrier geometry of the state of the art prevents this operation, so when restraint systems with a wood appearance are desired, the system must be made entirely of wood, thereby failing to reach the desired restraint level.

[0005] Document ES1056150U describes a restraint system with a variable thickness, solid wood barrier which, on its face facing the road, has a double wave shape. In this restraint system, the profile of the barrier does not allow the overlapped coupling of several barriers, so the attachment between barriers must be done through an intermediate part. The profile of the barrier also complicates the stacked storage of barriers. Furthermore, this kind of barrier is capable of restraining vehicles of up to 1500 kg, so it fails to reach the high restraint level.

[0006] Document ES2279734A1 describes a restraint system with a combined wood and metal barrier, having a wood beam and a "sigma"-shaped reinforcing metal profile that is nailed into the wood beam. A barrier of the type described works by means of the joint interaction of the wood beam and the "sigma"-shaped metal profile, and is capable of restraining vehicles of up to 1500 kg, so it also fails to reach the high restraint level. Furthermore, the metal profile does not allow the overlapped coupling of barriers.

Description of the Invention

[0007] To solve the mentioned problems present in the state of the art and to achieve other advantages that will be mentioned below, a barrier according to claim 1 is provided as a first inventive aspect, a vehicle restraint system according to claim 13 is provided as a second inventive aspect, and a method for installing the system according to claim 14 is provided as a third inventive aspect. The dependent claims define preferred embodiments of the invention.

[0008] A first inventive aspect relates to a barrier for a vehicle restraint system, the cross-section of which comprises:

two straight barrier section sectors attached by a stamping located substantially in a central portion of the cross-section, the barrier section sectors being longitudinally traversed by one and Lhe same imaginary axis of the cross-section plane, and

two wings, each of them attached to a barrier section sector at the ends of the barrier section sectors opposite those attached to the stamping, each wing forming an obtuse angle with the barrier section sector to which it is attached and both wings protruding on the same side of the imaginary axis longitudinally traversing the two barrier section sectors,

wherein the stamping has a cross-section with two substantially straight sectors attached to one another by a bend and each sector attached at its other end to a barrier section sector.

[0009] Throughout the present document, the bend of the stamping according to the invention must be interpreted to mean that in the stamping cross-section, the two substantially straight sectors are attached to one another forming a non-zero angle between them, and said sectors of the stamping extending in diverging directions from the bend where they are joined together to the attachment of each one with the corresponding barrier section sector.

[0010] The geometry of the stamping of the barrier allows housing in the stamping of a first barrier the stamping of a second barrier according to the invention when one barrier is stacked on another or when they are coupled one after another with a certain overlap to reinforce the attachment between barriers.

[0011] Throughout the present document, a stamping located substantially in a central portion of the barrier cross-section will be understood to be located in the cross-section closer to the center of the barrier cross-section than to any of the two ends.

[0012] The three-dimensional barrier is produced from the cross-section defined by means of the translation of the cross-section along the axis perpendicular to the plane of said cross-section, the cross-section being substantially constant along said axis.

[0013] Advantageously, the barrier of the invention, with two straight and planar sectors contained in the same plane, the continuity of which is broken only by the stamping, results in a barrier restraint capacity of up to

13000 kg.

[0014] Furthermore, due to its geometry, the barrier of the invention is made by means of a simple manufacturing process, and allows easy stacking and storage.

[0015] The configuration of a barrier according to the invention is also advantageous because the fact that the barrier has a substantially planar geometry except for the central stamping and the wings bent at an obtuse angle, facilitates the overlapped longitudinal coupling of barriers because the barrier geometry allows fitting one barrier on another. This overlapping of barriers results in a strong coupling that enables a vehicle restraint system including several barriers coupled in an overlapping manner one after the other to behave as if it were formed by a single continuous barrier: the stresses that the restraint system receives when it is hit by a vehicle are transmitted longitudinally and, accordingly, the system has a high bending strength; this increases the durability of the elements of the restraint system and the possibilities of keeping the vehicle on the roadway.

[0016] In one embodiment, the sum of the lengths of the barrier section sectors contained in the imaginary axis with respect to which the wings and the stamping protrude is greater than 65% the length of the orthogonal projection of the barrier cross-section on said imaginary axis.

[0017] In one embodiment, the length of the orthogonal projection of the stamping on the imaginary axis longitudinally traversing the barrier section sectors is less than 20% the length of the orthogonal projection of the barrier cross-section on the axis longitudinally traversing the barrier section sectors.

[0018] In one embodiment, the stamping of the barrier has a substantially V-shaped cross-section. It will be understood that the vertex of the V shape can be rounded.

[0019] In one embodiment, the straight sectors of the stamping form an angle comprised between 60° and 100°. Throughout the document, the defined intervals will be understood to include the ends thereof.

[0020] In one embodiment, each wing forms with the barrier section sector to which it is attached an angle comprised between 100° and 140°.

[0021] In one embodiment, the stamping and the wings protrude from the same side of the imaginary axis longitudinally traversing the two barrier section sectors. In an alternative embodiment, the stamping and the wings protrude from opposite sides of the imaginary axis longitudinally traversing the two barrier section sectors.

[0022] In one embodiment, the barrier cross-section is symmetrical with respect to an imaginary axis traversing the stamping and perpendicular to the imaginary axis longitudinally traversing the two straight sectors. In an alternative embodiment, the two sectors of the stamping cross-section have a different length, giving rise to a stamping and barrier cross-section not symmetrical with respect to an imaginary axis traversing the stamping and perpendicular to the imaginary axis longitudinally traversing the two straight sectors.

[0023] In one embodiment, the length of the orthogonal projection of the complete barrier cross-section (C) on the imaginary axis longitudinally traversing the straight barrier cross-section sectors and the distance (D) between the point of the stamping cross-section farthest from said imaginary axis and the imaginary axis itself verify the ratio C/D>4.

[0024] In one embodiment, the distance (D) between the point of the stamping farthest from the imaginary axis longitudinally traversing the barrier section sectors and said imaginary axis is less than 100 mm.

[0025] In one embodiment, the distance (E) between the point of each wing farthest from the imaginary axis longitudinally traversing the barrier section sectors and said imaginary axis is less than 50 mm.

[0026] In one embodiment, the barrier is a metal barrier, preferably a steel barrier.

[0027] In one embodiment, the barrier comprises covering means coupled to the barrier on the side from which the stamping protrudes. Advantageously, the barrier geometry of the invention allows simple coupling of covering means for the purpose of increasing protection in the event of a vehicle impact, or for decorative purposes. These covering means can be made of wood or of any other material.

[0028] A second inventive aspect relates to a vehicle restraint system comprising a post and a barrier according to the first inventive aspect, the barrier being fixed to the post such that the side of the barrier facing the post is the side opposite the one from which the stamping protrudes.

[0029] In one embodiment, the vehicle restraint system comprises a spacer through which the barrier is fixed with the post.

[0030] In one embodiment, the spacer of the vehicle restraint system has a cross-section comprising:

a first straight spacer section sector,
a second straight spacer section sector attached to the first straight spacer section sector such that it forms an obtuse angle with it,
a third straight spacer section sector attached to the second spacer section sector at the end opposite the one which is attached to the first spacer section sector, the second spacer section sector forming an obtuse angle with the third spacer section sector and the third spacer section sector and the first spacer section sector being parallel to one another,
fourth and fifth straight spacer section sectors such that the spacer cross-section is symmetrical with respect to an imaginary axis perpendicular to the third spacer section sector and traversing the third spacer section sector at the mid-point.

[0031] A third inventive aspect relates to a method of installing a vehicle restraint system comprising the following steps:

installing at least one post, and
fixing at least one barrier according to the first inventive aspect to the at least one post, such that the side of the barrier facing the post is the side opposite the one from which the stamping protrudes.

[0032] In one embodiment, the method of installing a vehicle restraint system additionally comprises coupling covering means to the barrier on the side from which the stamping protrudes.

[0033] The barrier of the invention advantageously allows the restraint to be greater than in conventional systems and it allows covering the barrier with other materials, for aesthetic and/or protective purposes.

[0034] All the features and/or steps of methods described in this specification (including the claims, description and drawings) can be combined in any combination except the combinations of such mutually excluding features.

Brief Description of the Drawings

[0035] To better understand the invention, its objects and advantages, the following drawings are attached in which the following is depicted:

Figure 1 shows the cross-section of a first embodiment of the barrier according to the invention.
Figure 2 shows the cross-section of a barrier according to the invention, where certain geometric parameters are identified.
Figure 3 shows an exploded view of an embodiment of a restraint system according to the invention.
Figure 4 shows an enlarged detail of the barrier of Figure 3.
Figure 5 shows the cross-section of a second embodiment of the barrier according to the invention.
Figure 6 shows the cross-section of a third embodiment of the barrier according to the invention.
Figure 7 shows the spacer of the restraint system depicted in Figure 3.
Figure 8 shows an exploded view of a second embodiment of a restraint system according to the invention.
Figures 9 to 11 schematically depict the behavior of a system according to the invention in case of a vehicle impacting against the barrier.

Detailed Description of the Invention

[0036] Figures 1 and 2 show the cross-section of a barrier (1) according to a first embodiment of the invention, where two straight barrier section sectors (7A, 7B) are seen which are attached by means of a stamping (4) located in the central portion of the barrier (1) cross-section. The two barrier section sectors (7A, 7B) are longitudinally traversed by one and the same imaginary axis (y) of the cross-section plane. Figure 2 more clearly shows how the two straight barrier section sectors (7A, 7B) are arranged along said imaginary axis (y) of the cross-section plane.

[0037] The barrier (1) cross-section additionally has two wings (5A, 5B), each of them attached to one of the barrier section sectors (7A, 7B) at the ends of the barrier section sectors that are not attached to the stamping (4). Each wing (5A, 5B) forms an obtuse angle (α) with the barrier section sector (7A, 7B) to which it is attached. Figures 1 and 2 show that the two wings (5A, 5B) protrude from the same side of the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B), which would be towards the right side of the imaginary axis (y) in the depiction of Figure 2.

[0038] The stamping (4) has a cross-section with two straight sectors attached to one another forming an angle and each sector attached to a barrier section sector (7A, 7B).

[0039] The wings (5A, 5B) located at the ends of the barrier (1) and the stamping (4) give the barrier (1) the stiffness necessary to prevent excessive deformations when it receives the impact of a vehicle that has gone off course. Furthermore, the wings (5A, 5B) of the ends form an obtuse angle with the straight barrier sectors (7A, 7B), a configuration which contributes to additionally increasing the stiffness of the barrier.

[0040] As discussed above, the straight sectors (7A, 7B) of the barrier cross-section are longitudinally traversed by one and the same imaginary axis (y) of the cross-section plane, or in other words, the straight sectors (7A, 7B) of the barrier are contained in one and the same imaginary plane, with respect to which the wings and the stamping protrude.

[0041] Figure 3 shows a perspective view of a vehicle restraint system according to the invention, including a barrier (1) according to the invention, at least one post (2) and at least one spacer (3) in this embodiment. Figure 4 shows an enlarged portion of the barrier (1) of Figure 3 to more clearly see the two straight barrier sectors (7A, 7B), attached by the central stamping (4), and the two wings (5A, 5B) at the ends of the barrier, each one connected with a barrier sector (7A, 7B).

[0042] As can be seen in Figures 3 and 4, the three-dimensional barrier is produced from the cross-section depicted in Figures 1 and 2 by means of the translation of the cross-section along the axis perpendicular to the cross-section plane, the cross-section being substantially constant along said axis.

[0043] The barrier (1) according to the invention, with two straight and planar sectors (7A, 7B) the continuity of which is broken only by the stamping (4), without including wave shapes and with the straight sectors (7A, 7B) contained in the same plane, results in an increase in the restraint capacity with respect to the restraining barriers of the state of the art.

[0044] Figures 9 to 11 schematically show the behavior of a restraint system according to the invention, i.e., provided with a barrier according to the invention. For the

sake of simplicity, these figures depict the barrier in the form of a planar plate rather than with its actual profile. Nevertheless, it must be understood that the behavior described below corresponds to a barrier with the features defined according to the invention, such as those depicted in Figures 1 to 6, and not to the completely planar barrier geometry used in Figures 9 to 11. Furthermore, though not depicted, the restraint system could be provided with spacers for fixing the barrier to the posts.

[0045] Figures 9 to 11 show a perspective view, a plan view and a side view, respectively, of the restraint system in case of a vehicle impacting against the barrier. The initial phase of the restraint system before receiving the impact is depicted farthest to the right in the drawings and is identified as P0. In response to the impact of a heavy vehicle, and due to the considerable flatness of the barrier geometry, a large surface of the vehicle chassis is supported on the barrier (100), causing, in a first phase after the impact, a purely transverse displacement of the restraint system towards the outside of the road, i.e., away from the roadway, because the barrier (100) transmits the energy and it pushes the restraint system, the barrier not rotating about its main axes. This effect directly transmits stress to the posts (200), which are stiff elements and, during a brief plastic phase, transform part of the energy provided by the vehicle into their own deformation, as schematically shown in situation P1 depicted in the center in Figures 9 to 11. During this phase P1, the barrier (10C) remains substantially non-deformed and the posts (200) anchor the system on them, allowing the barrier (200) itself to work, behaving like a beam mounted on two supports, when the plastic deformation phase of the posts (200) ends. In this second phase, identified as P2 and depicted to the left in Figures 9 to 11, the barrier (200) must withstand all the energy of the vehicle such that it can withstand tensile and bending stresses without actually breaking. The central nose or stamping of the barrier increases the stiffness of the element without reducing the advantages associated with the substantial flatness of the barrier.

[0046] In addition to the advantages discussed above, the barrier of the invention has other advantages, some of which have already been discussed: the manufacturing process is substantially simpler than in the case of other barriers as a result of the absence of complex geometries. The barriers according to the invention can be easily stacked and stored, and it is simple to couple covering means (6) to the barrier, by means of suitable coupling means, to increase protection against possible impacts with the barrier or for decorative purposes (for example, coverings made of wood).

[0047] In the embodiments shown in Figures 1 to 4, the stamping (4) protrudes from the same side as the wings (5A, 5B) of the imaginary plane containing the two straight barrier sectors (7A, 7B) and has a V-shaped cross-section. Furthermore, the barrier (1) of these embodiments is symmetrical with respect to an imaginary axis (x) traversing the vertex of the V shape of the stamping (4) perpendicular to the straight barrier section sectors (7A, 7B), as seen in Figure 2.

[0048] As discussed, in one embodiment of the barrier (1) the stamping (4) has a cross-section with two sectors substantially forming a V shape, as in the case of Figures 1 and 2.

[0049] In a preferred embodiment, the angle (β) between the two sectors of the stamping is comprised between 60° and 100°, a range of values for which the bending strength of the barrier additionally increases.

[0050] Additionally or alternatively, the obtuse angle (α) between the wings (5A, 5B) and the barrier sectors (7A, 7B) is comprised between 100° and 140°, thus achieving optimal bending strength.

[0051] In one embodiment, the sum of the length of the two straight sectors (7A, 7B) of the barrier cross-section (A+A') is greater than 65% the length of the orthogonal projection of the complete barrier cross-section (C) on the imaginary axis (y) longitudinally traversing the straight sectors (7A, 7B) of the barrier cross-section.

[0052] In one embodiment, the length of the orthogonal projection of the portion of the barrier cross-section corresponding to the stamping (B) on the imaginary axis (y) longitudinally traversing the straight sectors of the barrier cross-section is less than 20% the length of the orthogonal projection on this axis (y) of the complete barrier cross-section (C).

[0053] In one embodiment, the length of the orthogonal projection of the complete barrier cross-section (C) on the imaginary axis (y) longitudinally traversing the straight sectors (7A, 7B) of the barrier cross-section and the distance (D) between the point of the stamping cross-section farthest from said imaginary axis (y) and the imaginary axis (y) verify the ratio C/D>4. The distance (D) between the point of the stamping cross-section farthest from the imaginary axis (y) longitudinally traversing the straight sectors (7A, 7B) of the barrier cross-section and said imaginary axis is preferably less than 100 mm.

[0054] In one embodiment, the distance (E) between the point of each wing farthest from the imaginary axis longitudinally traversing the barrier section sectors and said imaginary axis is less than 50 mm.

[0055] As discussed above, the different lengths and angles characterizing the barrier geometry are schematically depicted in Figure 2.

[0056] Figure 5 depicts the cross-section of a barrier (1) according to a second embodiment of the invention. The barrier according to this second embodiment differs from the barrier depicted in Figures 1 to 4 in that the stamping (4) and the wings (5A, 5B) in this case protrude from opposite sides of the imaginary plane containing the straight barrier sectors (7A, 7B). Figure 5 shows that the stamping protrudes to the left of the imaginary axis (not depicted) containing the cross-section sectors (7A, 7B), whereas the wings (5A, 5B) protrude to the right of said imaginary axis.

[0057] In a case where the stamping and the wings protrude from opposite sides, such as that depicted in

Figure 5, the side of the barrier intended for receiving a possible impact of a vehicle travelling off the roadway is the side from which the stamping protrudes. Therefore, when assembling the barrier as part of a restraint system, it will be placed with the side from which the wings protrude facing the post and the side from which the stamping protrudes facing the road provided for vehicle circulation.

[0058] Figure 6 shows the cross-section of a third embodiment of the barrier according to the invention. In this embodiment the stamping (4) and the wings (5A, 5B) protrude from the same side of the imaginary axis containing the straight sectors (7A, 7B), as in the case of Figures 1 to 4. However, in this third embodiment, the stamping does not have a symmetrical cross-section, but rather a straight sector of the stamping is shorter than the other.

[0059] Figure 3 shows a restraint system according to the invention. This restraint system has at least one post (2) and at least one barrier (1) according to the invention, the barrier (1) being fixed to the post (2) such that the side of the barrier facing the post is the side opposite the one from which the wings (5A, 5B) and the stamping (4) protrude. The restraint system of Figure 3 additionally has a spacer (3) through which the barrier (1) is connected to the post (2). Contact of the post (2) with the wheel of the vehicle when the vehicle impacts against the restraint system is prevented or at least somewhat hindered by means of the spacer (3).

[0060] As discussed above, the barrier (1) of the restraint system of Figure 3 corresponds to an embodiment like that shown in Figures 1 and 2, i.e., with a stamping having a symmetrical cross-section and protruding from the plane containing the straight barrier sectors on the same side as the wings (5A, 5B). Nevertheless, other barrier embodiments according to the invention, such as those exemplified in Figures 5 and 6, could also be used in a restraint system such as the one shown in Figure 3.

[0061] The barrier shown in Figure 3 additionally has holes at its longitudinal ends for the overlapped coupling with other barriers to give rise to a longer system.

[0062] The spacer (3) of Figure 3 is shown in an enlarged detail in Figure 7 to see it better. This spacer (3) has a cross-section with five straight sectors. The spacer has a straight central sector (8). Two intermediate spacer straight sectors (9, 10) form an obtuse angle with the central spacer sector (8), attached one on each side of the central sector (8). Two other straight spacer sectors (11, 12) parallel to the central sector (8) are located at the ends of the spacer cross-section, connected with the intermediate spacer sectors (9, 10). The spacer (3) cross-section of this embodiment is symmetrical with respect to an imaginary axis traversing the central sector (8) of the spacer cross-section. The presence of a spacer (3) according to the embodiment of Figure 7 in the restraint system of Figure 3 contributes to increasing the bending strength of the system.

[0063] In the embodiment of Figure 3, the anchoring posts have a C-shaped cross-section, once again aiding the system as a whole to work more efficiently under bending.

[0064] Figure 8 shows a restraint system according to the invention additionally comprising covering means (6), in this case made of wood, for decorative and/or protective purposes. The covering means (6) are fixed to the barrier (1) on the side envisaged for facing the roadway and for receiving the potential impact of a vehicle that has gone off course, i.e., the side of the barrier (1) from which the wings (5A, 5B) and the stamping (4) protrude. Other covering means can additionally be placed to cover the visible portion of the posts (2).

Claims

1. A barrier (1) for a vehicle restraint system, the cross-section of which comprises:

   two straight barrier section sectors (7A, 7B), attached by a stamping (4) located substantially in a central portion of the cross-section, the barrier section sectors being longitudinally traversed by one and the same imaginary axis (y) of the cross-section plane, and
   two wings (5A, 5B), each of them attached to a barrier section sector (7A, 7B) at the ends of the barrier section sectors (7A, 7B) opposite those attached to the stamping (4), each wing (5A, 5B) forming an obtuse angle with the barrier section sector (7A, 7B) to which it is attached and both wings (5A, 5B) protruding on the same side of the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B),
   wherein the stamping (4) has a cross-section with two substantially straight sectors attached to one another by a bend and each sector attached at its other end to a barrier section sector (7A, 7B).

2. The barrier (1) according to claim 1, wherein the sum of the lengths of the barrier section sectors (7A, 7B) is greater than 65% the length of the orthogonal projection of the barrier (1) cross-section on the imaginary axis longitudinally traversing the barrier section sectors (7A, 7B).

3. The barrier (1) according to any of the preceding claims, wherein the length of the orthogonal projection of the stamping (4) on the axis longitudinally traversing the barrier section sectors (7A, 7B) is less than 20% the length of the orthogonal projection of the barrier (1) cross-section on the axis longitudinally traversing the barrier section sectors (7A, 7B).

4. The barrier (1) according Lo any of the preceding claims, wherein the stamping (4) has a substantially

V-shaped cross-section.

5. The barrier (1) according to any of the preceding claims, wherein the sectors of the stamping (4) form an angle comprised between 60° and 100°.

6. The barrier (1) according to any of the preceding claims, wherein each wing (5A, 5B) forms an angle comprised between 100° and 140° with the barrier section sector (7A, 7B) to which it is attached.

7. The barrier (1) according to any of the preceding claims, wherein the stamping (4) and the wings (5A, 5B) protrude from the same side of the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B).

8. The barrier (1) according to any of claims 1-6, wherein the stamping (4) and the wings (5A, 5B) protrude from opposite sides of the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B).

9. The barrier (1) according to any of the preceding claims, wherein the barrier cross-section is symmetrical with respect to an imaginary axis (x) traversing the stamping (4) and perpendicular to the imaginary axis (y) longitudinally traversing the two barrier section sectors (7A, 7B).

10. The barrier (1) according to any of the preceding claims, wherein the length of the orthogonal projection of the complete barrier cross-section (C) on the imaginary axis longitudinally traversing the straight barrier section sectors and the distance (D) between the point of the stamping cross-section farthest from said imaginary axis (y) and said imaginary axis (y) verify the ratio C/D>4.

11. The barrier (1) according to any of the preceding claims, made of metal.

12. The barrier (1) according to any of the preceding claims, comprising covering means coupled to the barrier (1) on the side from which the stamping (4) protrudes.

13. A vehicle restraint system comprising a post (2) and a barrier (1) according to any of the preceding claims, the barrier (1) being fixed to the post (2) such that the side of the barrier facing the post is the side opposite the one from which the stamping (4) protrudes.

14. A method of installing a vehicle restraint system comprising the following steps:

installing at least one post (2),

fixing at least one barrier (1) according to any of claims 1-11 to the at least one post (2) such that the side of the barrier facing the post is the side opposite the one from which the stamping (4) protrudes.

15. The method of installing a vehicle restraint system according to the preceding claim, which additionally comprises coupling covering means to the barrier (1) on the side from which the stamping (4) protrudes.

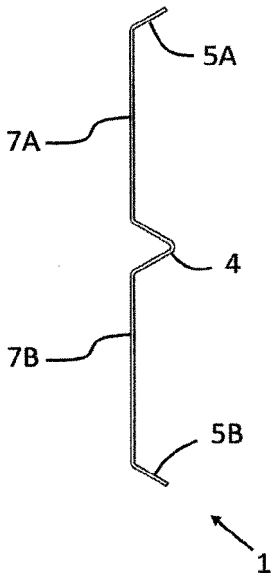

FIG. 1

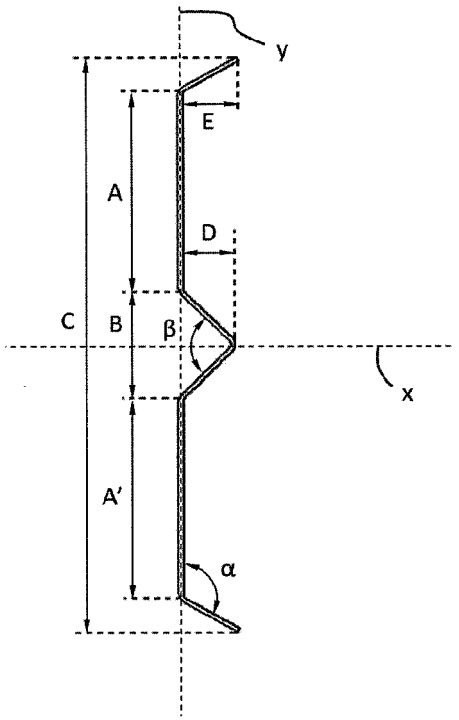

FIG. 2

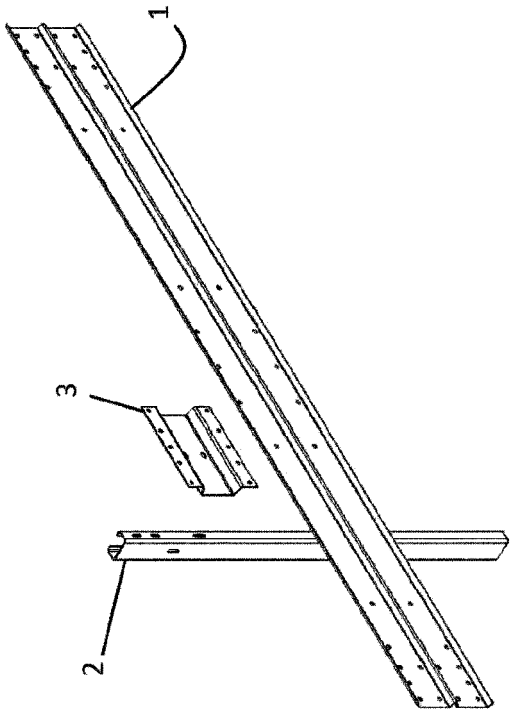

FIG. 3

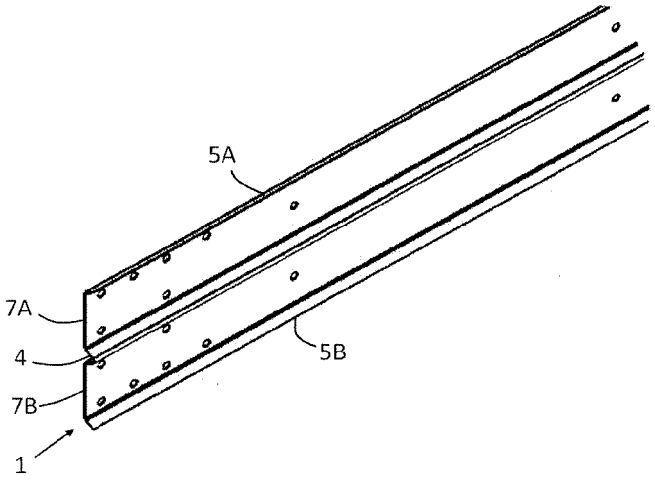

FIG. 4

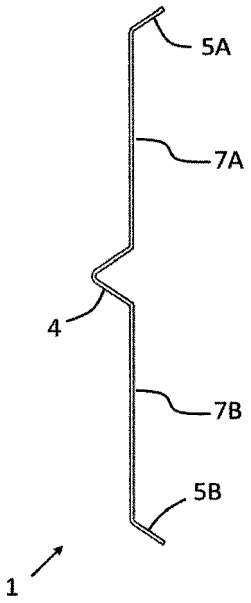

FIG. 5

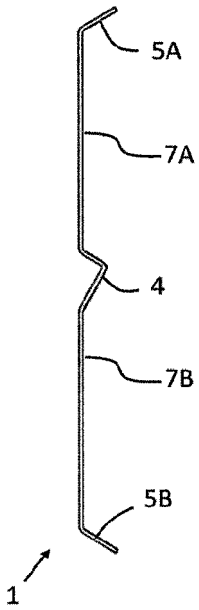

FIG. 6

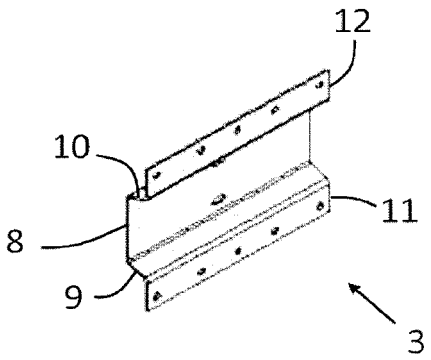

FIG. 7

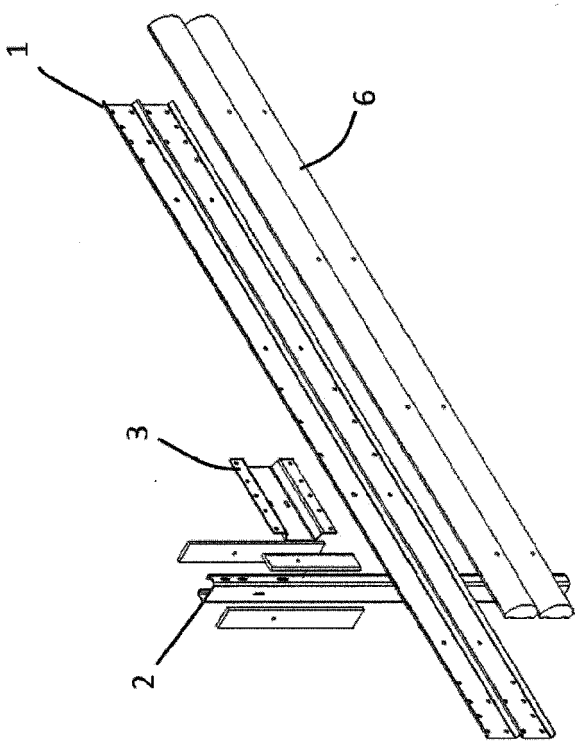

FIG. 8

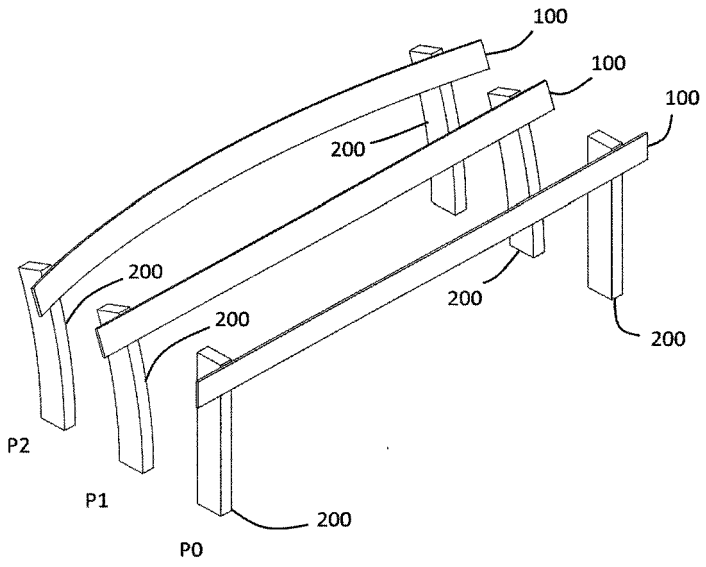

FIG. 9

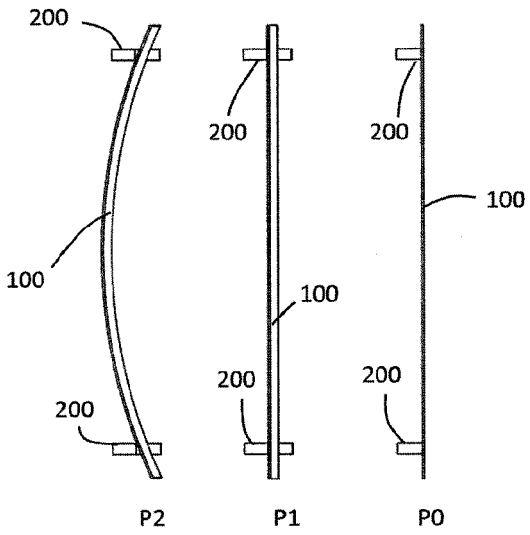

FIG. 10

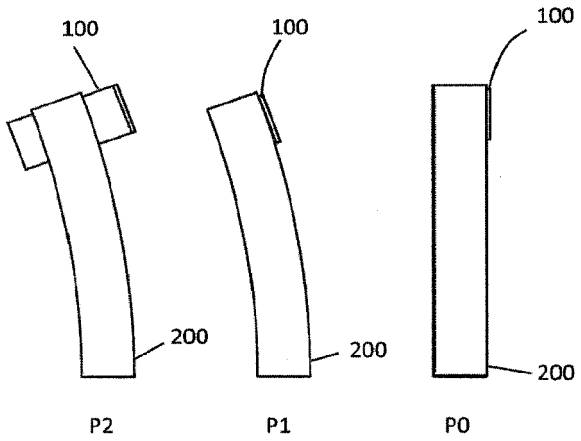

FIG. 11

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 December 2013	Flores Hokkanen, P

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