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(54) **Highway guardrail protector from impacts by motorcyclists**

(57) The protector, designed for its application in highway guardrails, for the purpose of avoiding or minimizing the impact of motorcyclists, is based on placing between the lower border of the double-away if section making up the classic guardrail and the ground some protecting folded sheet metal sections (4), with a deformable layer (5) adhered and assembled on the original supports or posts of the corresponding guardrail, carrying out the fastening or assembly by means of anchors (3), also deformable, in order to achieve the closing of the opening between the guardrail sections (1) already installed and the pavement or ground, avoiding direct impacts against rigid parts or the fallen motorists leaving the roadway.

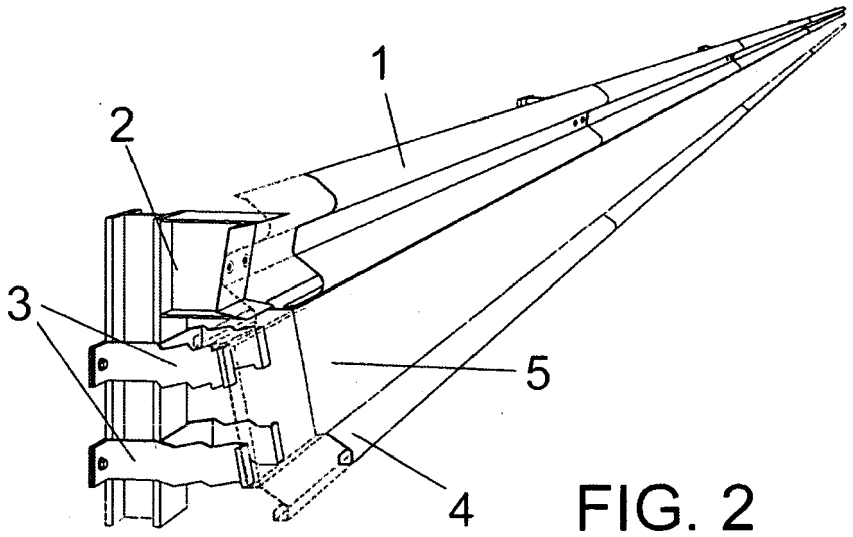

FIG. 2

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Description

PURPOSE OF THE INVENTION

[0001] This invention refers to a highway guardrail protector from impacts by motorcyclists, specifically designed for its application on those guardrails or barriers that are installed at the side of the roads to avoid vehicles veering off the road in case of mistake or accident.

[0002] The purpose of the invention is to provide a protector applicable to the aforementioned type of guardrail, to avoid or minimize the injuries to motorcyclists in view of the impact from falling against the rails currently installed in highways and roads, as well as those of new installation.

BACKGROUND OF THE INVENTION

[0003] At present, for the purpose of physically delimiting the edges of the highways and to provide a certain protection to the vehicles regarding their possible veering off the road, guardrails are installed, consisting of a running profile, generally of sheet metal stamped in the shape of a double wave, which runs along the exterior edges of the highway or road in the direction of motion, and that is anchored to the pavement by means of some supports or posts built into the ground, commonly manufactured in and "I" profile or standardized rectangular, and placed at regular intervals (usually at four metres) that allows supporting this profile of the guardrail at a certain height along the route of the highway.

[0004] Normally, the profiles comprising the guard rails are placed in dangerous points of the route of the highways where there is a risk of the vehicles driving on the road veering off in an untimely manner. In this event, the guardrails act as a physical barrier of a certain effectiveness that impedes the vehicle leaving the road in case of moderate impact and they serve as an additional optical reference to spatially limit the road.

[0005] However, due to the placement on the supports or posts, at a certain height with respect to the pavement, for the purpose of avoiding the vehicles going over them in case of impact, there is a free space between the lower part and the pavement that presents a serious risk to motorcyclists and drivers of two-wheeled vehicles without bodywork, since it permits the passing of a complete person or part of him out of the road, leaving exposed the guardrail supports against the ground, so that there exists the real possibility of the driver impacting against it, of great rigidity and sharp edges, with the consequent danger of amputations and mortal injuries.

DESCRIPTION OF THE INVENTION

[0006] The primary purpose of the protector for the guardrails of this invention is to cover the opening existing between the double-wave profile making up the guardrail and the pavement, as well as effectively absorbing the energy of the motorcyclist's impact, in a way that minimizes or avoids bodily injury that could occur against the guardrail as a consequence of the impact, and keeping the cyclist within the limits of the road until he completely stops.

[0007] To accomplish this, the actual protector is comprised by an undefined series of folded metal sections assembled by their ends and overlapped in the direction of traffic longitudinally along the edge of the highway, placed in the space comprised between the original guardrail and the pavement, closing the free space between both in such a way as to avoid the passing of the body of the motorcyclist or any of his limbs.

[0008] The folded metal sections of the protector are shaped in such a way that their folded shape provides to the structure sufficient total moment of inertia to avoid the excessive plastic strain in case of impact that compromises the functionality of the guardrail. It is also provided with a lower cantilevered lip sloping upwards that provides a first impact-receiving area of great strain and low absorption of energy, to minimize the bending moments and excessive decelerations on the head and neck of the fallen cyclist, in case of receiving the impact head first, while, having reached the strain limit, it moves the cyclist's body upwards to receive against the central part of the structure the full impact of the rest of the body.

[0009] The area of the full impact of the body on the folded section of the guardrail protector is covered by an exterior elastically deformable layer that increases the contact surface of the cyclist's body with the protector during the impact, in order to minimize the damage by concentrating the occasional stresses in local parts of the body at the moment of impact. This exterior elastic layer is manufactured in recycled rubber from granulated, pulverized tires or made in filaments or fibres, shaped and compacted through the use of different agglomerating resins, especially of polyurethane for its high resistance, adherence and power of elastic distortion.

[0010] For the purpose of minimizing the possible injuries caused by the moments induced on the fallen motorcyclist's neck, due to the possible friction and adherents on his head on the elastic layer of compacted rubber, this can be covered with an anti-adherent primer such as an adhered film of low superficial roughness and/or low friction coefficient, so that it permits or facilitates sliding during the impact of the cyclist's head or other parts of his anatomy susceptible of suffering damage for this reason.

[0011] This deformable exterior layer is fastened to the section of folded metal of the protector glued with resin or appropriate glue, being able to be aided in this fastening with the use of screws, rivets or other mechanical fastener embedded in the surface of this elastic layer.

[0012] The set formed by the folded metal section together with the exterior deformable layer of compacted rubber is fastened to and suspended from the original supports or posts of the guardrail by means of their corresponding anchors, which permit the installation directly

on the guardrails already installed, without the need to make any modifications to them.

[0013] These anchors incorporate in their design the metalwork needed to fasten them solidly to the guardrail posts or supports, while they hold the sheet metal protector in its working position, so that it closes the opening existing between the pavement and the edge of the guardrail, eliminating any space between the guardrail and the protector in order to avoid trapping or cutting fingers or any narrow part of the cyclist's anatomy through accidental inclusion and it effectively protects the body of the cyclist from the direct impact on the guardrail supports.

[0014] For such purpose, and as the principal means of energy absorption from the impact, these anchors incorporate in their design a deformable part (intrinsic to the part or assembled separately) on which the folded sheet metal protector is anchored. The distortion of this part during the impact can be elastic, plastic or a combination of both, and it is in charge of absorbing the kinetic energy of the cyclist's body during the impact, maintaining the deceleration that the body undergoes at safe levels described by the UNE 135900 standard of 2008 by means of the correct calculation of its deformation constant k and of the effective useful path of this deformation.

DESCRIPTION OF THE DRAWINGS

[0015] To complement the description that is presented below and for the purpose of leading to a better understanding of the characteristics of the invention, in accordance with a preferred example of its practical realisation, a set of drawings are attached as an integral part of this description, in which as an example but without limitation, the following has been shown:

Figure 1 - It shows the typical assembly of a guardrail on the roadway, lacking any protection system, in which the double-wave shape is identified and its supports or posts that anchor it to the ground.

Figure 2 - This shows the assembly of the complete protector of the invention for guardrails.

PREFERRED REALIZATION OF THE INVENTION

[0016] As can be seen in the referenced figures, and specifically in Figure 1, a typical guardrail is shown with its corresponding double-wave profile (1) and their respective supports or posts (2) to which the difference sections making up the guardrail (1) are fastened and those supports or posts (twos) are anchored appropriately to the ground.

[0017] In Figure 2 this same guardrail is shown as represented in the previous figure but incorporating the protector of the invention, closing the space between the edge of the double wave (1) of the guardrail and the corresponding ground or pavement, with the purpose of avoiding the passing of a motorcyclist's body or any on his limbs between the ground and the edge of the guardrail.

[0018] Specifically, the protector of the invention is comprised by folded sheet metal sections (4) assembled at their edges and overlapped in the direction of traffic, one after another longitudinally and along the edge of the highway, with these protector sections being provided with a deformable layer (5) adhered on the section or sections made of the folded sheet metal (4), constituting the deformable anchorage, which, as can be seen in a different figures, can present different designs and configuration, as long as they comply with the conditions of energy absorption and appropriate deformation path for its proper functioning.

[0019] As for the deformable layer (5) adhered to the exposed part of the section or sections made of the folded sheet metal (4), it will be manufactured in recycled rubber from compacted tires with polyurethane resin, without discarding of the materials.

[0020] Finally, they asked for mentioned sections constituting the folded sheet metal sections (4) with their deformable layer (5) are anchored to the guardrail (1) support or supports (2) by means of the for mentioned deformable anchors (3), that incorporate in their design a deformable part as means of energy absorption (intrinsic to the peace or forming a subassemblage of the support itself), on which it is anchored in turn the protector section of folded sheet metal (4).

Claims

1. - Protector for highway guardrails from impacts of motorcyclists, which being designed for the application and the type of double-wave guardrails (1) appropriately fastened between supports made of posts (2) duly anchored on the ground, and the protector in question has as its purpose to close the space between the lower border of the double wave section of the guardrail (1) and the ground, **characterized by** an undefined series of folded sheet metal sections (4), assembled together at their ends and overlapped longitudinally one over another in the direction of the traffic and along the edge of the highway; having planned that these sections of folded sheet metal (4) are complemented with a deformable layer (5) adhered to the exposed part corresponding to the certain sections of the corresponding deformable anchors (3), with the latter being connected to the supports or posts (2) to which are fastened the guardrails (1).

2. - Highway guard rail protector from impacts of motorcyclists, according to claim 1, **characterized by** the deformable layer (5) being adhered to folded sheet metal sections (4) by means of glowing with resin, or else by mechanical fastening with screws, bolts or rivets built in to the deformable layer itself

(5), or else by means of a combination of both techniques.

3. - Highway guard rail protector from impacts of motorcyclists, according to the above claims, characterized because in the fastening between the folded sheet metal section (4) and the corresponding deformable anchors (3) optionally, a piece comprised of a metallic section or screwed or welded auxiliary structure to facilitate the corresponding fastening or assembly.

4. - Highway guard rail protector from impacts of motorcyclists, according to claim 1, **characterized by** the deformable layer (5) being elastic and manufactured in recycled rubber from granulated tires in different sizes, pulverized or in the form of filaments or fibres, being shaped and compacted by means of the use of different agglomerating resins, preferably polyurethane in its different types.

5. - Highway guard rail protector from impacts of motorcyclists, according to claim 4, **characterized by** the deformable layer (5), as an elastic exterior layer, being susceptible to being covered by an anti-adherent primer, such as a film adhered with an exposed surface of low surface roughness and/or low friction coefficient, permitting and facilitating the sliding during impact of the cyclist's head or other parts of his anatomy susceptible to suffering damage by the moments induced in the impact itself.

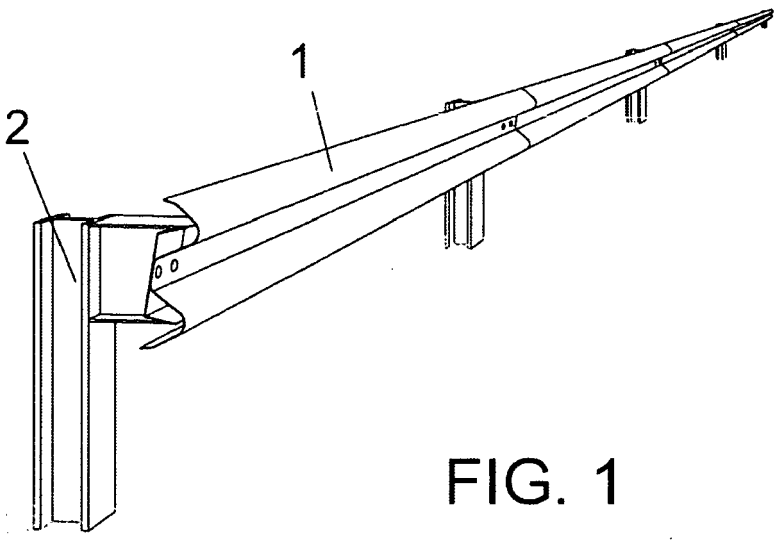

FIG. 1

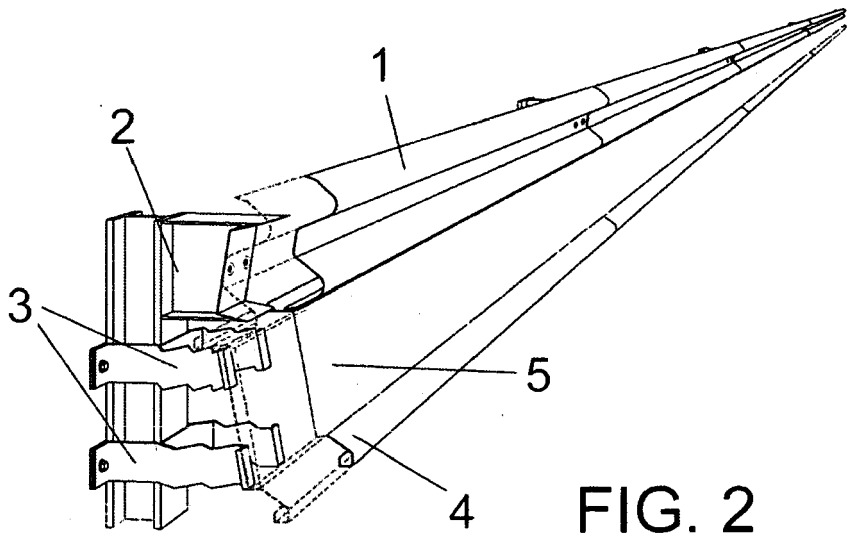

FIG. 2

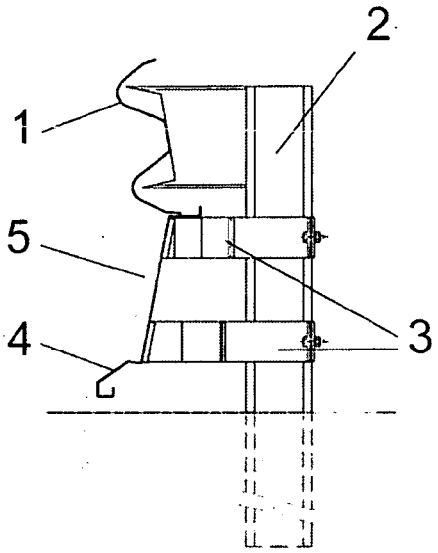

FIG. 3

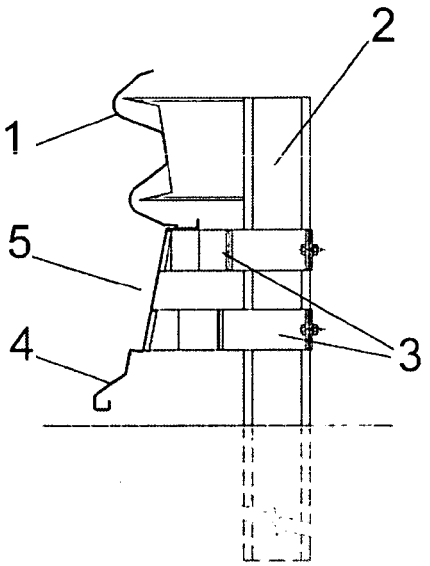

FIG. 4

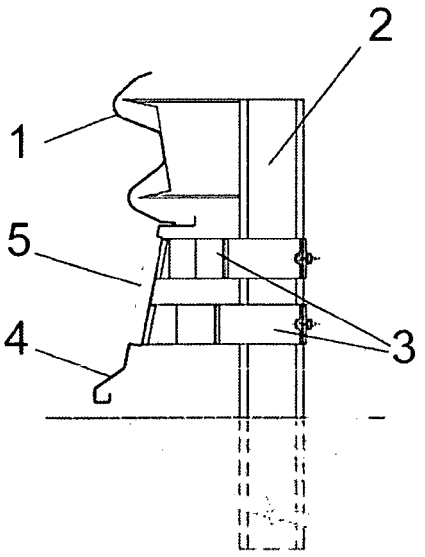

FIG. 5

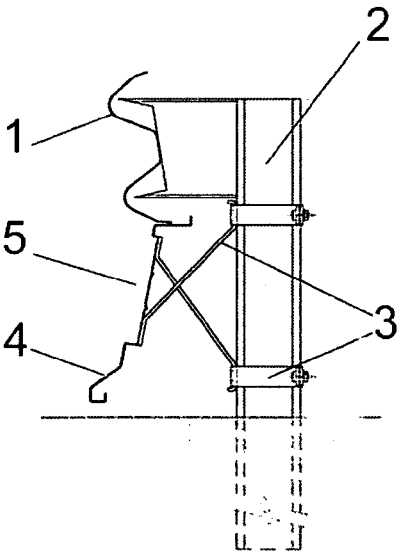

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 10 38 0050

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 1 626 126 A1 (SPIG SCHUTZPLANKEN PROD GMBH [DE]) 15 February 2006 (2006-02-15) * column 3, line 26 - column 4, line 22; figures 1,2 *	1-5	INV. E01F15/04
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A	EP 1 455 020 A1 (PROFIL R [FR]) 8 September 2004 (2004-09-08) * paragraph [0008]; figures 3-6 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	31 August 2010	Flores Hokkanen, P

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 38 0050

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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31-08-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82