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(54) **PROTECTION DEVICE FOR GUARDRAILS**

SCHUTZVORRICHTUNG FÜR LEITPLANKEN

DISPOSITIF DE PROTECTION POUR GLISSIÈRES DE SÉCURITÉ

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(56) References cited:

EP-A1- 0 297 182 EP-A1- 1 555 349

EP-A1- 1 650 354 ES-A1- 2 277 791

ES-U- 1 064 686 ES-U- 1 067 213

GB-A- 2 440 145

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Description

Object of the Invention

[0001] The present invention relates to a protective device for guardrails, which provides essential features of novelty and considerable advantages with respect to the means known and used for the same purposes in the current state of the art.

[0002] More particularly, the invention proposes the development of a protective device for the assembly thereof in, and the combined use with, the guardrails currently installed in interurban roads, designed and dimensioned for their assembly under the guardrail elements in a manner approximately coplanar therewith, to cover and close the space usually existing between the latter and the surface of the ground, concealing and protecting the vertical posts supporting and securing said guardrail elements to reduce or eliminate the danger of the latter, with the particularity that the protective device consists of a substantially planar, flexible and relatively elastic longitudinal strip molded from an elastomeric material, mainly from waste tire material, able to withstand impacts and absorb the energy resulting therefrom.

[0003] The field of application of the invention is comprised within the industrial field dedicated to the manufacture and/or installation of elements, devices and means associated with road safety.

Background and Summary of the Invention

[0004] Everyone generally knows of the existence along any interurban road, i.e., on both sides of highways, expressways and freeways, of elements known as guardrails, between which the space of the road on which vehicles travel is demarcated, along with the space of the side shoulders in highways which incorporate them. These guardrails also have the function of damping impacts up to a certain level, and they consist of longitudinal profiles of a metallic material, formed with longitudinal corrugations to provide them with greater resistance, such that the various sections successively align with one another along each of the sides of the road on which they are installed, being supported by vertical posts located at a pre-determined distance in positive correlation with the length of each profile section. The fixing is usually performed with the aid of screws or rivets housed in the valleys of the corrugations, such that the heads do not project with respect to the plane determined by the crests of the corrugations in order to prevent them from injuring a user who may possibly hit against the guardrail element.

[0005] Given that the guardrail elements are located at a certain distance from the ground, the mentioned posts are exposed through the distance existing between the lower edge of each element and the ground itself, it being a proven fact that the mentioned posts are a true danger for users, specifically for motorcyclists, given the

high number of accidents resulting in death and irreversible injuries occurring every year. In fact, when a motorcyclist falls to the ground at a certain speed and is driven due to the effect of the kinetic energy he accumulates, the impact against any of these posts usually has horrific results, which should be avoided at all cost.

[0006] Attempts have been made in the state of the art to provide some type of solution which allows at least reducing this important problem and the number of deaths and injuries occurring each year. For that purpose, several alternatives have been proposed for covering the posts in different ways and avoiding the danger thereof in the event that an impact should inevitably occur. However, the various proposals made until now have not offered sufficient guarantees of protection for users and the tests conducted do not demonstrate the elimination of the dreaded injuries when a motorcyclist is involved in an accident and hits against the mentioned posts.

[0007] ES 1 064 686 U discloses a guardrail with a protective device covering the space between the guardrail element and the ground. The protective device comprises planar, longitudinal protective elements having rectilinear upper and lower edges.

[0008] As a result, taking into account the problems and risks that the currently existing guardrails represent for motorcyclists, the main objective of the present invention is the development and creation of a protective device which allows assuring the integrity of the user in a possible accident. This objective has been fully met by means of the device which will be the object of description below, the main features of which are included in the characterizing portion of the enclosed claim 1.

[0009] Essentially, the protective device proposed by the invention consists of a rolled element, with a general elongated, substantially planar shape, and dimensioned such that it allows being placed under current guardrails, i.e., closing the space currently existing between said guardrails and the surface of the ground, protecting and concealing the vertical posts in their entire height. Therefore, when a motorcyclist falls to the ground due to the effect of an accident and hits against the protective element, he is retained by said element, without the possibility of crossing under the guardrail, or of hitting against the post because, as stated, it remains concealed.

[0010] The protective element is built from a damping material, specifically from an elastomeric base obtained from used tires, by means of any molding technique. This allows the protective element to have excellent damping characteristics, with the additional advantage that it allows reusing waste tires, thereby simultaneously solving the difficulties that the elimination thereof presents. In order for the protective element to have the properties and characteristics of flexibility, relative elasticity and resistance required according to the application for which it is intended, it includes metal, for example steel, strips, embedded along its length, whereas its useful surface (i.e., the face that is turned towards the inner part of the

roadway) can include reflective strips, or the elements can even be manufactured with different colors in order to make it easier to see the protector. The fixing of each element between contiguous posts is performed with the aid of clamps and screws passing through holes made in positions close to each end of each element, and traversing the metal strips embedded along each protective element.

[0011] As will be understood, with a protective device obtained from elements such as the one described above, a person suffering an accident will not be able to pass under a guardrail and hit against a vertical support post, thus preventing the serious consequences that this type of impact usually involves.

Brief Description of the Drawings

[0012] These and other features and advantages of the invention will be more clearly understood from the following detailed description of a preferred embodiment thereof, provided only as an illustrative and non-limiting example, with reference to the attached drawings in which:

Figure 1A is a schematic perspective view of a protective element of those used in the device proposed by the invention;

Figure 1B is an elevational view of a cross section made through the protective element of Figure 1A;

Figure 2 shows a schematic elevational view of a common guardrail of those existing in the current state of the art;

Figure 3 illustrates a schematic perspective view of a fixing clamp of these used together with the protective

element of Figure 1A, and

[0013] Figure 4 illustrates a schematic elevational view of the same conventional guardrail of Figure 2 in which the protective element of Figure 1A is already located.

Description of a Preferred Embodiment

[0014] As mentioned in the foregoing, the detailed description of the preferred embodiment of the protective device of the present invention will be given with the aid of the attached drawings throughout which the same reference numbers are used to designate identical or similar parts. Thus, in first considering the depiction of Figure 1A, a schematic perspective view of a preferred embodiment of a protective element 1 can be seen, which is designed as a substantially planar longitudinal strip with constant width, demarcated by a straight longitudinal edge which, once installed, occupies an upper position, and an opposite or lower edge, in which there are some longitudinal portions 1b projection in relation to end and intermediate position/positions which, when the element is installed, form support parts for said element on the

surface of the ground, as is best seen in Figure 4 of the drawings.

[0015] According to the depicted embodiment, the element has a stepped surface in relation to the "visible" face, i.e., the face of the element which, when installed, faces the roadway. This stepping leads to the formation of raised longitudinal bands 2a, and recessed, also longitudinal bands 2b. These mentioned latter bands 2b house through holes 4 in relation to positions close to both ends, intended for housing screws, bolts or the like (not depicted) used to keep the protective element installed. Furthermore, at least one of the recessed bands 2b can be used, if desired, to contain a type of reflective means, as in the position shown with reference number 5 in the mentioned figure, whether it is an independent means attached to the protective element, or sections painted on the protective element itself. Likewise, the protective element 1 itself could be manufactured with different colors aiding the users to see and distinguish the protective element quickly and easily.

[0016] As discussed above, the protective element has metal, preferably steel, strips embedded along its length for the purpose of providing it with suitable flexibility and with a greater capacity of resistance against an impact. These strips are of pre-determined dimensions and are embedded in the protective element during the molding phase thereof. An embodiment is shown in Figure 1B of the drawings, which shows a cross section made in the element 1 at the height of lines B-B, in which the embedded metal strips are clearly seen inside the recessed bands 2b, and they are indicated with reference numbers 3.

[0017] When analyzing the content of Figure 2 of the drawings, it shows an elevational view of a guardrail of the type existing in the current state of the art. This guardrail consists of profile sections 6 with certain corrugations, arranged contiguously with others along each of the edges of a roadway, these guardrail sections 6 being supported by means of vertical posts 7, successively separated by a pre-determined distance, and anchored at the lower part in the surface of the ground 8. As depicted, there is a distance in height between the lower edge of the guardrail element 6 and the surface of the ground 8, which is enough so that a motorcyclist can move in that space and hit against any of the posts 7 with the deadly consequences which have already been discussed. This is precisely the space which is to be covered with the protective element such that the posts 7 are not any danger whatsoever for a motorcyclist falling to the ground as the consequence of an accidental action. This form of protection is clearly depicted in Figure 4 of the drawings, in which the protective device 1 of the invention is already installed in the vertical position under the conventional guardrail 6, and in front of the posts 7 which it conceals. As can be seen, the height of the element 1 is such that it occupies virtually the entire space initially existing under the guardrail 6, with its portions 1b projecting like lower legs supported on the surface of the ground. In

these conditions, a motorcyclist is prevented from being able to hit against any of the posts 7 as the consequence of a fall, providing him suitable protection by means of the element 1 of the protective device in accordance with the damping provided by the elastomeric material with which it has been built, and also as a result of the general flexibility of said element.

[0018] The fixing of the protective element 1 in its operative position is performed by means of the same posts 7 already installed and supporting the guardrails 6. To that end, as shown in Figure 3 of the drawings, the invention has provided for the use of clamps 9, with a general omega-shape, of quadrangular section, dimensioned for being adapted to the post 7 itself from the part opposite the position of the protective element 1. The clamps include openings 10 in relation to each of its side flanges, which openings 10 are located in correspondence with the holes 4 made at the ends of the protective element 1, such that the interlocking operation can be carried out with the intervention of screws or the like (not depicted) housed through each of the pairs formed by a hole 4 and an opening 10 opposite one another. The assembly operation is thus fast and easy, and the disassembly operation can also be carried out comfortably if necessary.

[0019] It is not considered necessary to extend the content of the present description so that a person skilled in the art can understand its scope and the advantages derived therefrom, as well as to carry out the practical embodiment of its object.

[0020] Notwithstanding the foregoing, and since the description made corresponds only with a preferred embodiment, it will be understood that within its essential nature it is possible to introduce multiple modifications and variations in detail, which are also comprised within the scope of the invention, and which may particularly affect, features such as the shape, size or manufacturing materials, or any other that do not alter the invention as it has been described and as it is defined in the following claims.

Claims

1. A protective device for guardrails, particularly a protective device provided for its combined use with currently existing guardrails installed along each side of an interurban roadway, for the purpose of covering the space currently existing between the lower edge of a conventional guardrail element (6) and the surface (8) of the ground such that the vertical posts (7) supporting and securing said guardrails are safeguarded and concealed, the protective device being structured from generally planar longitudinal protective elements (1), with constant width, **characterized in that** a protective element (1) is demarcated by a first rectilinear edge (1a) with upper positioning, and by a second longitudinal edge of lower position-

ing in which there are incorporated portions (1b) projecting in end and intermediate positions of the second edge which, when the element is installed, form support parts for the element on the surface of the ground, the visible face surface of the protective element (1) having a stepped profile in which there are defined projecting bands (2a), raised with respect to the surface plane, and recessed bands (2b), lowered with respect to the surface plane, in which recessed bands (2b) the protective element (1) has been provided with through holes (4) in the vicinity of each of the ends.

2. The device according to claim 1, **characterized in that** the protective element (1) consists of a flexible, elastic body obtained by means of a molding operation from an elastomeric material, preferably waste tire material, incorporating metal strips (3), preferably steel strips, embedded along the protective element (1) in positions corresponding with the longitudinal recessed bands (2b) of said element.
3. Guardrail with a device according to claims 1 and 2, **characterized in that** the fixing of the protective element, (1) in its operative position under the existing guardrail element (6) is performed by securing to the vertical support posts (7) of the guardrail themselves, for which purpose the incorporation of omega-shaped clamps (9) has been provided, which clamps are provided with through openings (10) in each of its side flanges provided in positions correspondingly coinciding with the holes (4) of the ends of each protective element. (1).

Patentansprüche

1. Schutzvorrichtung für Schutzplanken, insbesondere eine Schutzvorrichtung, die für ihre kombinierte Verwendung mit aktuell bestehenden, entlang jeder Seite einer Überlandstraße installierten Schutzplanken vorgesehen ist, zum Zwecke des Abdeckens des Raumes, der momentan zwischen der unteren Kante eines herkömmlichen Schutzplankenelements (6) und der Oberfläche (8) des Bodens vorhanden ist, derart, dass die vertikalen Pfosten (7), die die Schutzplanken stützen und sichern, geschützt und verborgen sind, wobei die Schutzvorrichtung aus allgemein ebenen, längslaufenden Schutzelementen (1) mit konstanter Breite aufgebaut ist, **dadurch gekennzeichnet, dass** ein Schutzelement (1) durch eine erste geradlinige Kante (1a) mit oberer Positionierung und durch eine zweite längslaufende Kante mit unterer Positionierung begrenzt ist, in die Teile (1b) eingeschlossen sind, die an End- und Zwischenpositionen der zweiten Kante herausragen, die, wenn das Element eingebaut ist, Stützteile für das Element auf der Oberfläche des Bodens bilden, wo-

bei die Oberfläche der sichtbaren Fläche des Schutzelements (1) ein gestuftes Profil hat, in dem herausragende Bänder (2a), die bezüglich der Oberflächenebene erhöht sind, und eingesenkte Bänder (2b), die bezüglich der Oberflächenebene abgesenkt sind, definiert sind, wobei das Schutzelement (1) in den eingesenkten Bändern (2b) mit Durchgangsbohrungen (4) in Nähe der jeweiligen Enden versehen ist.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das Schutzelement (1) aus einem flexiblen, elastischen Körper besteht, der mittels eines Formungsvorgangs aus einem elastomeren Material, vorzugsweise Altreifenmaterial, erhalten wird und Metallstreifen (3), vorzugsweise Stahlstreifen, enthält, die entlang des Schutzelements (1) in Positionen eingebettet sind, die den längslaufenden eingesenkten Bändern (2b) des Elements entsprechen.
3. Schutzplanke mit einer Vorrichtung nach Ansprüchen 1 und 2, **dadurch gekennzeichnet, dass** das Befestigen des Schutzelements (1) in seiner Einsatzposition unter dem bestehenden Schutzplankelement (6) durch Sichern an den vertikalen Stützpfeuern (7) der Schutzplanke selbst durchgeführt wird, wobei zu diesem Zwecke die Einbeziehung von Omega-förmigen Schellen (9) vorgesehen wurde, wobei die Schellen an jedem ihrer Seitenflansche mit Durchgangsöffnungen (10) versehen sind, die in Positionen entsprechend übereinstimmend mit den Bohrungen (4) der Enden des jeweiligen Schutzelements (1) bereitgestellt sind.

Revendications

1. Dispositif de protection pour glissières de sécurité, en particulier un dispositif de protection prévu pour son utilisation combinée avec des glissières de sécurité existant actuellement installées le long de chaque côté d'une route interurbaine, dans le but de recouvrir l'espace existant actuellement entre le bord inférieur d'un élément de glissière de sécurité conventionnelle (6) et la surface (8) du sol de façon que les poteaux verticaux (7) soutenant et arrimant lesdites glissières de sécurité soient protégés et dissimulés, le dispositif de protection étant structuré à partir d'éléments de protection longitudinaux généralement plats (1), de largeur constante, **caractérisé en ce qu'un** élément de protection (1) est délimité par un premier bord rectiligne (1a) avec positionnement supérieur, et par un second bord longitudinal de positionnement inférieur dans lequel sont intégrées des portions (1b) se projetant dans des positions d'extrémité et intermédiaires du second bord qui, lorsque l'élément est installé, forment des parties de support pour l'élément sur la surface du sol,

la surface de la face visible de l'élément de protection (1) ayant un profil échelonné dans lequel sont définies des bandes en saillie (2a), élevées par rapport au plan de surface, et des bandes évidées (2b), abaissées par rapport au plan de surface, dans ces bandes évidées (2b) l'élément de protection (1) a été prévu avec des trous traversants (4) à proximité de chacune des extrémités.

2. Le dispositif selon la revendication 1, **caractérisé en ce que** l'élément de protection (1) consiste en un corps élastique, souple obtenu au moyen d'une opération de moulage à partir d'un matériau élastomère, de préférence un matériau en déchets de pneu, dans lequel sont incorporées des bandes de métal (3), de préférence des bandes d'acier, incrustées le long de l'élément de protection (1) à des places correspondant aux bandes évidées longitudinales (2b) dudit élément.
3. Glissière de sécurité avec un dispositif selon les revendications 1 et 2, **caractérisé en ce que** la fixation de l'élément de protection (1) dans sa position opérationnelle sous l'élément de glissière de sécurité existante (6) est réalisée en l'arrimant aux propres poteaux de support verticaux (7) de la glissière de sécurité, ce pour quoi a été prévue l'intégration de colliers de serrage en forme d'oméga (9), ces colliers de serrage sont fournis avec des ouvertures traversantes (10) dans chacune de leurs brides latérales prévues à des places respectives qui coïncident avec les trous (4) des extrémités de chaque élément de protection (1).

SECTION B-B

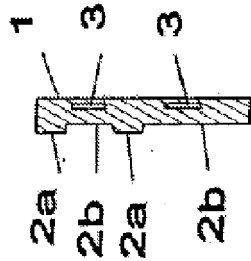


FIG.1B

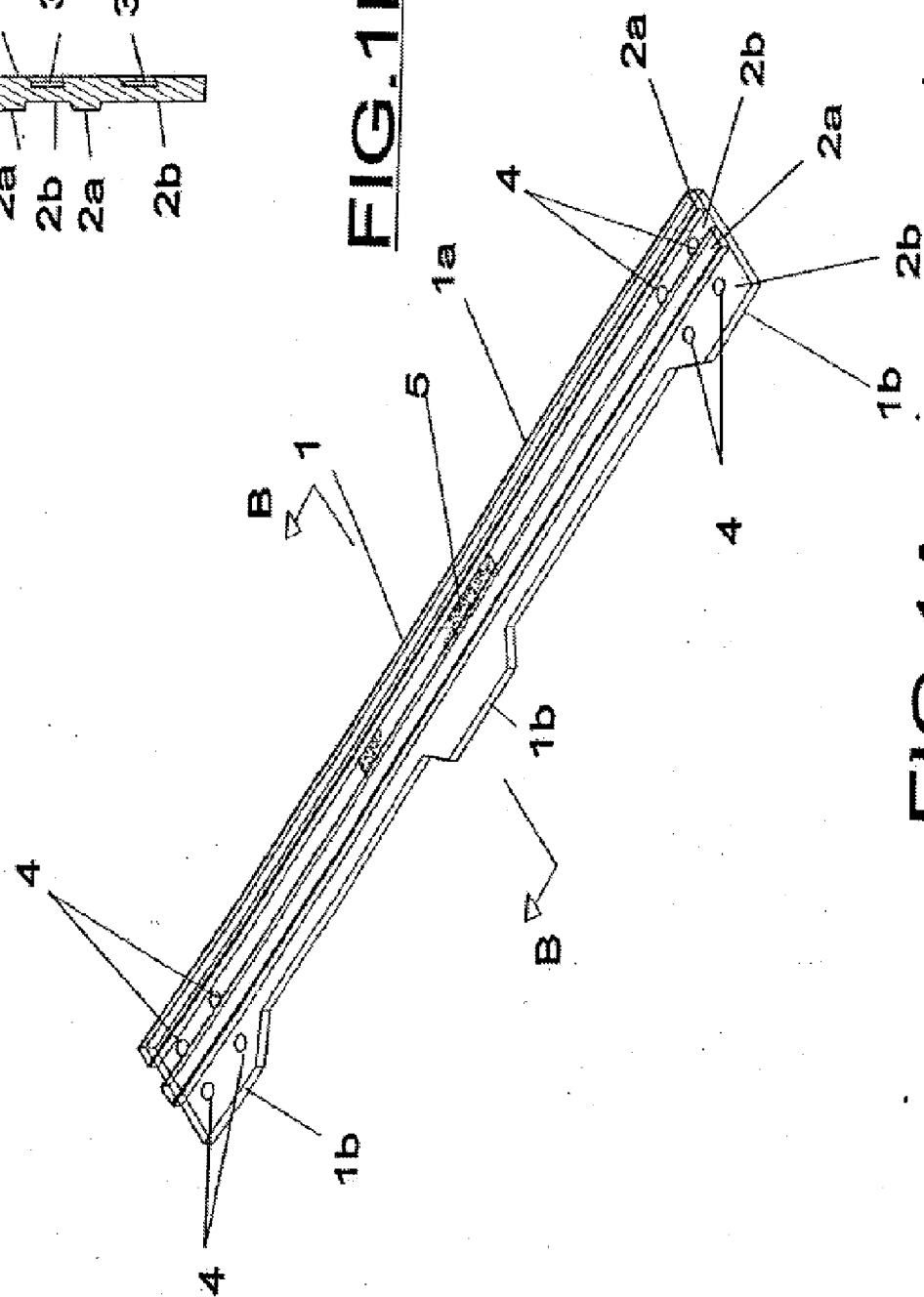


FIG.1A

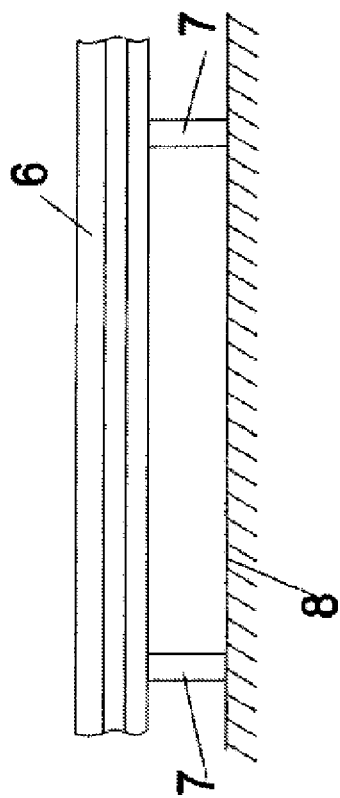


FIG. 2

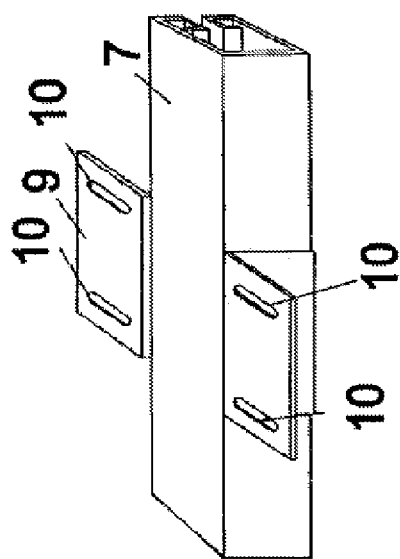


FIG. 3

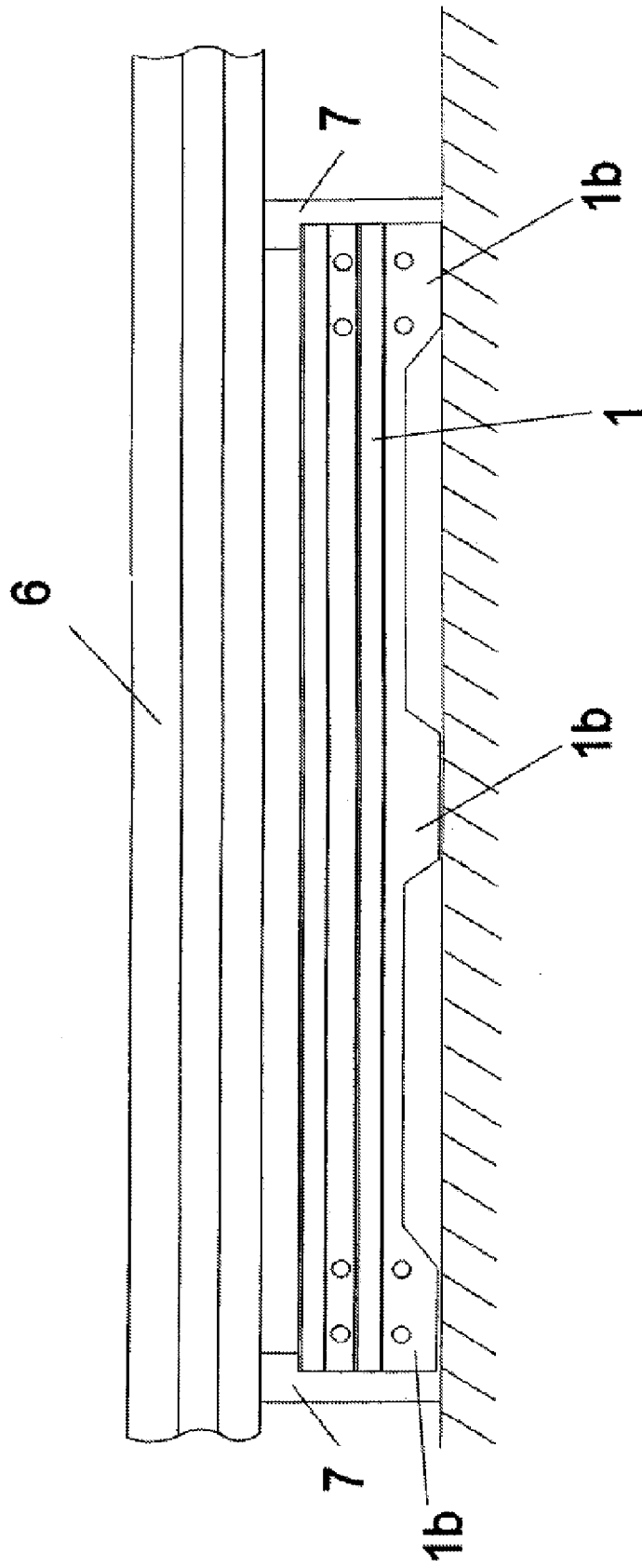


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 1064686 U [0007]