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GUARD RAIL OR ROAD PROTECTION BARRIER HAVING A HOLLOW BEAM BOOM

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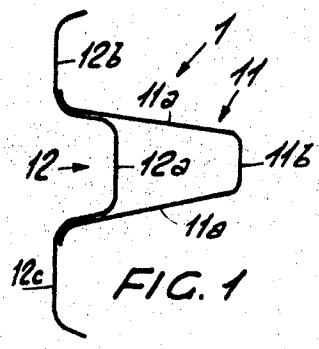


FIG. 1

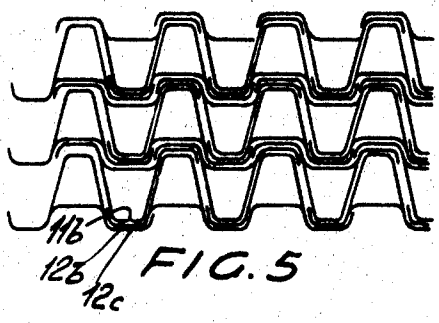


FIG. 5

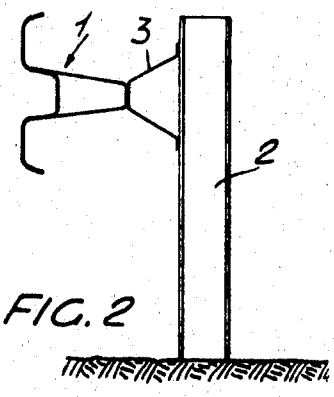


FIG. 2

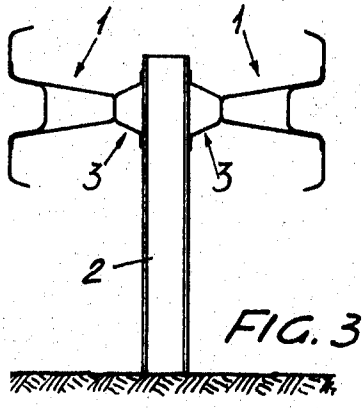
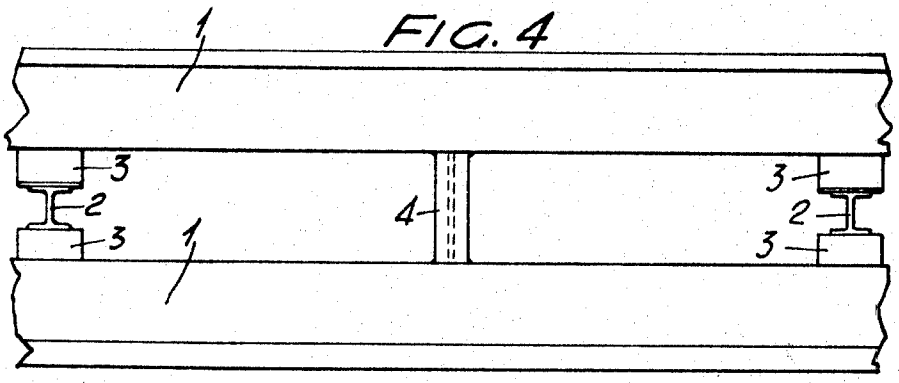


FIG. 3

FIG. 4



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GUARD RAIL OR ROAD PROTECTION BARRIER HAVING A HOLLOW BEAM BOOM

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Int. Cl. E01f *15/00*
U.S. Cl. 256—13.1 3 Claims

ABSTRACT OF THE DISCLOSURE

The highway guard rail is composed of a very rigid hollow horizontal girder rigidly connected to vertical standing plastically deformable posts. When the girder is struck, the posts yield.

This invention relates to a guard rail or road protection barrier, adapted to be located at the road edge, particularly a motor-way edge, or at the traffic island between the cart-roads of a motor-way, where the space available for the guard rail is rather limited.

The features a guard rail of the above type has to meet with are contrasting with one another.

On one hand it is indeed necessary that the guard rail withstand the substantial mpacts of heavy vehicles with moderate deformations, limited by the space being available on the roadway: therefore, the guard rail has to be of a high efficiency and rigidity. On the other hand, a guard rail adapted to meet the above requirements would cause extreme damages to light vehicles for which a somewhat more flexible behavior would be necessary.

Generally the well known guard rails attempt to come to a compromise between such two opposite requirements, however without attaining fully satisfactory behaviours.

When correctly formulated, the pursuit of such a compromise may give a different importance to the two opposite requirements, considering the different use conditions, such as the greater or lesser impact probability of heavy or light vehicles, and the greater or lesser danger (that is, probability of damages to persons and things) related to such impacts.

It is therefore the object of the present invention to provide a guard rail capable of solving the two problems giving a slightly greater importance to the impact of light vehicles, without neglecting however the impact of heavy vehicles.

Therefore, such a guard rail is suitable for use where the impact probability of a heavy vehicle is rather limited, such as on the traffic island, or where the danger of the impact itself is limited, such as on road edges corresponding to sloping shoulders.

By a particular guard rail the two opposite requirements could be met at the same time, said guard rail being of an increasing rigidity as the length of the contact zone with the vehicle increases.

Thus, the guard rail can be of a continuous high efficiency and rigidity which increases as the length increases and hence as the weight of the impacting vehicle generally increases.

Such a guard rail is formed of a plurality of relatively deformable vertical pedestals of an essentially plastic deformation and a horizontal boom for one or each work side, the boom being formed of a hollow beam or girder having a relatively high rigidity and being supported by said pedestals.

The accompanying drawing diagrammatically shows by

way of example only an embodiment of the guard rail according to the present invention. In the drawing:

FIGURE 1 shows a sectional view of the continuous hollow beam or girder;

FIGURES 2 and 3 are sectional views of a single and two-stage guard rail, respectively, formed of the beam or girder of FIGURE 1;

FIGURE 4 is a plan view of the two-stage guard rail of FIGURE 3;

FIGURE 5 is the piling diagram for the lengths of the beam or girder of FIGURE 1 for transport and storage.

With particular reference to FIGURE 1 it is seen that the hollow girder **1**, making up the boom for the guard rail according to the invention, is formed of a front corrugated strip **12**, therewith contacting the impacting vehicle, and a back section **11** having a substantially isosceles trapezium cross-section devoid of the major base and with outwardly bent edges, said section being in any way connected to the strip, such as by welding.

With reference to the erection mode of the girder, the corrugated strip **12** includes a median groove **12*a***, the walls of which externally adhere to the ends of the legs **11*a*** of the back section **11**, and two upper and lower hollow ribs **12*b*** and **12*c***, respectively, having the outer edges bent to said back section **11**.

One of the two hollow ribs, such as the lower rib **12*c*** is slightly wider than the other, for example the upper rib **12*b***, and the latter is in turn wider than the bottom **11*b*** of section **11**.

As a whole, girder **1** has a high flexure and torsion rigidity with a low weight.

As from the foregoing, its shape is such that a convenient and efficient piling is allowed, that is with a minimum overall dimensions, for transport and storage. As from FIGURE 5, rib **12*c*** is adapted to contain within the bore thereof the rib **12*b*** of the adjacent girder, and in turn rig **12*b*** is adapted to contain the bottom **11*b*** of the overlying girder, which is invertedly superimposed.

It is intended that girder **1** can also be made by using a front strip **12** of a different shape from that shown in FIGURE 1. The guard rail of FIGURE 2 is formed of a continuous horizontal girder **1** carried by a plurality of vertical pedestals **2** through rigid spacing supports **3**.

The two-stage guard rail of FIGURE 3, suitable for being applied on a traffic island, is formed of two continuous parallel horizontal girders **1**, carried by a plurality of central pedestals **2** through rigid supports **3**; moreover, the two horizontal girders **1** can be connected by intermediate spacers **4**.

In both events, pedestals **2** are formed of preferably H-sections, the dimensions of which are such as to have nonexcessive rigidity and limit load and in proportion to the particular impact conditons of usage.

Particularly, the basic feature that the guard rail rigidity increases as the length of the impacting vehicle increases is achieved through the use of essentially plastically deforming pedestals and through an accurate proportioning of the pitch and limit load of the pedestals to the horizontal girder rigidity, which girder should however have a quite high rigidity.

Thus, the rigidity and strength increase as the length of the impacting vehicle increases, since the number of pedestals and the length of the boom involved by the impact increase; through an accurate sizing, this allows to achieve a guard rail having a satisfactory behaviour against the impact of different weight vehicles, from utility to industrial vehicles, since the vehicles of a larger weight generally also have a larger length.

In addition, due to the fact that the pedestals mainly suffer permanent deformations, the energy being returned is but a small fraction of the initial impact energy; moreover, deformation and impact force being the same, the

energy absorbed is much greater than in well known guard rails.

The distance between the inner edge of the guard rail and the inner edge of the pedestal (with respect to the road) is such that the direct impact of a portion of the vehicle against the pedestal is prevented, for obvious reasons, said impact being extremely dangerous for the vehicle and its occupants.

The considerable rigidity of the girder in association with the moderate strength of the pedestals is such that the girder deformation be always smooth, without forming too pronounced pockets, which could cause exceeding transverse decelerations and excessive damages therefore to the impacting vehicle and its occupants.

Finally it is to be noted that the particular outline of the hollow girder section, with a hollow rib of the front strip slightly wider than the other and with a suitable shape of the back outline, will allow a convenient and efficient piling for transport and storage of the girder sections. This latter advantage resides not only in reducing the space occupied by the piled sections or lengths, but also the advantage that through a correct bearing on suitable surfaces the pieces underlying the pile are not deformed by the weight of the overlying pieces.

Modifications and variations can be provided to the guard rail of the present invention without thereby going outside the protective field of the invention.

What is claimed is:

1. A highway barrier comprising a plurality of vertically standing plastically deformable pedestals, a very rigid hollow girder rigidly secured to said pedestals, said girder being composed of a front corrugated rail having a median groove having horizontal side walls and an upper and a lower hollow ribs, and a back section having legs secured to said side walls, said back section having an approximately isosceles trapezium cross-section minus its major base.

2. A barrier as in claim 1, said pedestal having an H-shaped cross-section.

3. A barrier as in claim 1, further comprising a second similar girder secured to the opposite side of said pedestals, and spacers joining the girders intermediate of said pedestals.

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