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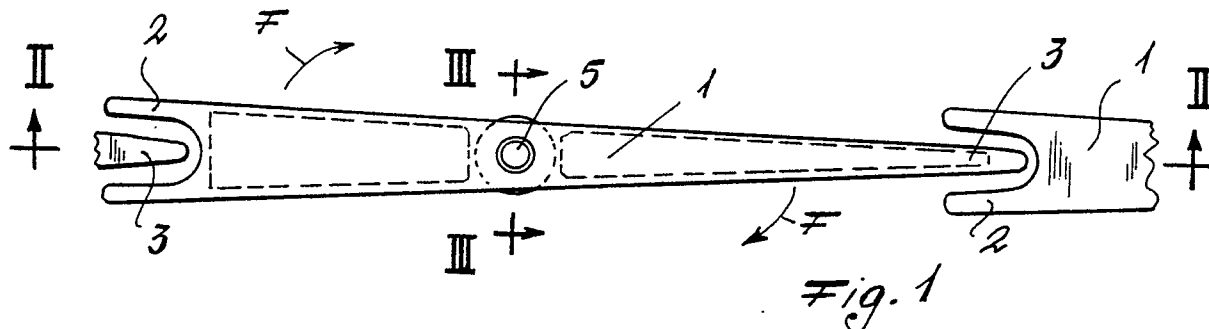
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**I-20129 Milano(IT)**(54) **Movable-element guard-rail.**

(57) The guard-rail consists of a series of elements each of which is pivoted on a fixed pin at its middle line: thus the single elements are movable and coupled to one another to unelastically absorb the kinetic energy generated by an autovehiclé impact.



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### Movable-element guard-rail

The present invention relates to a movable element guard-rail.

As is known, conventional guard-rails consist of rigid elements, of a comparatively strong material, arranged along the roadway and adapted for absorbing the kinetic energy from a vehicle impacting thereagainst.

The rigid structure of these guard-rails frequently causes serious damages to the autovehicle and to the person therein, as well as causes the vehicle to dangerously bounce on the road.

Accordingly, the main object of the present invention is to provide a guard-rail which is so shaped as to stop the vehicle impacting it in a less dangerous manner and without dangerous bouncings on the road.

This and other objects of the invention will become apparent to those skilled in the art from the following disclosure.

The guard-rail according to the invention is essentially characterized in that it consists of a series of elements which are pivoted on a fixed pin at their middle lines, each element being movable with respect to the others said elements being coupled to unelastically absorb the kinetic energy generated by an autovehicle impact.

More specifically, each element cooperates with the adjoining element through the interposition of loose coupling means, thereby the autovehicle impact causes a plurality of adjoining elements to rotate about their pivoting pins.

The coupling means consist of a fork member arranged at at least one end of an element, in which fork member there is loosely engaged the end portion of the adjoining element, said end portion of said adjoining element being of substantially pointed shape.

The resistance against rotation of the single elements about their pivot pins is suitably adjusted by means adapted for providing a given friction between the fixed pin and movable element.

The invention will be illustrated, by way of an illustrative but not limitative example, with reference to the figures of the accompanying drawings, where:

Figure 1 is a top view of a movable element, and shows the manner in which it is coupled to like movable adjacent elements, the thus obtained guard-rail being adapted for locating on the right side of a road;

Figure 2 is a cross-sectional view taken along the line II of Figure 1;

Figure 3 is a cross-sectional view taken along the line III-III of Figure 1; and

Figure 4 is a top view of a modified embodiment for making a guard-rail adapted for arrangement at the center of a road having two opposite lanes.

With reference to Figures 1-3, the guard-rail consists of a series of reinforced concrete elements 1, or optionally light boxes, metal prefabricated elements or vibrated concrete elements, which are filled in situ with concrete or inert material mixtures, each having a fork-shaped end 2 and a pointed end 3.

Each element 1 is provided, on the middle or center line thereof, with a hole 4 in which is freely seated a vertical pin 5 carried by a concrete pole 6, embedded into the roads surface P so as to allow for the element 1 to rotate (arrows F) as it is impacted.

In order to adjust by the desired friction the rotation of the element 1, inside the hole 4 it is possible to introduce suitable materials such as gravel, sand or the like.

As is shown in Figure 1, the end 3 of an element 1 freely penetrates the fork 2 of the adjoining element: thus, for a given rotation of an impacted element 1, there will occur a gradual and decreasing rotation of the adjoining element with a unelastic absorption of the impact energy.

In the embodiment illustrated in Figure 4, the solution is the same, with the difference that the guard-rail is generally formed by an alternating series of elements 7 and 8, each of which is also pivoted on a pivot pin 5.

With respect to the elements 1 shown in Figure 1, the elements 7 differ since they have two pointed ends, while the elements 8 differ because they have both their ends in the form of a fork.

With the disclosed structure, the guard-rail assembly will absorb unelastically the impact energy, that is the impact energy from the right side and the left side, and thus this solution is specifically adapted for arranging the guard-rail at the center line of a road having opposite lanes.

### Claims

1. A guard-rail characterized in that it consists of a series of elements, each element being pivoted on a fixed pin at its middle line, thereby the single elements are movable and coupled to one another so as to unelastically absorb the kinetic energy generated by an autovehicle impact.

2. A guard-rail, according to Claim 1, characterized in that each element cooperates with the adjoining elements through the inter-position of loose

coupled means, in such a way that an autovehicle impact causes a plurality of adjoining elements to rotated about their pivot pins.

3. A guard-rail, according to the preceding claims, characterized in that the coupling means consist of a fork member located at at least one end of an element, in said fork member loosely engaging the end of the adjoining element, the end of said adjoining element having a substantially pointed shape.

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4. A guard-rail, according to the preceding claims, characterized in that each element is provided, at the center line thereof, with a hole therein is housed the fixed pin, in the gap formed between said hole and pin there being provided means for adjusting the rotation friction resistance of said element.

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5. A guard-rail, according to claim 4, characterized in that said means consist of an inert material such as sand, gravel and the like.

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6. A guard-rail, according to the preceding claims, characterized in that it comprises an alternating series of first and second elements, the first elements having their both ends of point shape and the second elements having both their ends of fork shape.

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7. A guard-rail, according to the preceding claims, characterized in that the single elements are made of reinforced concrete.

8. A guard-rail, according to the preceding claims, characterized in that the single elements are formed by light boxes, metal or vibrated concrete elements, which are filled in situ by concrete or an inert material mixture.

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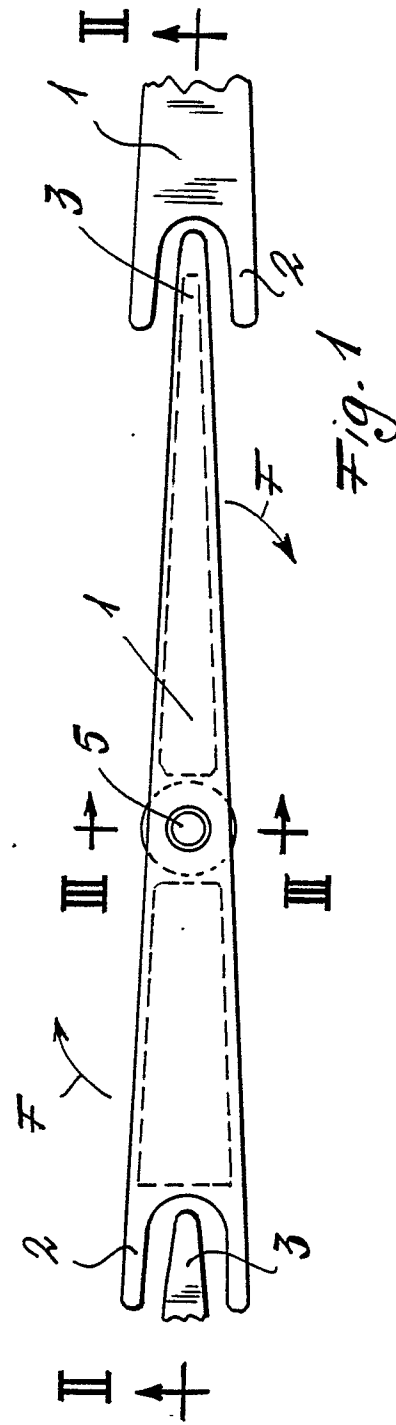
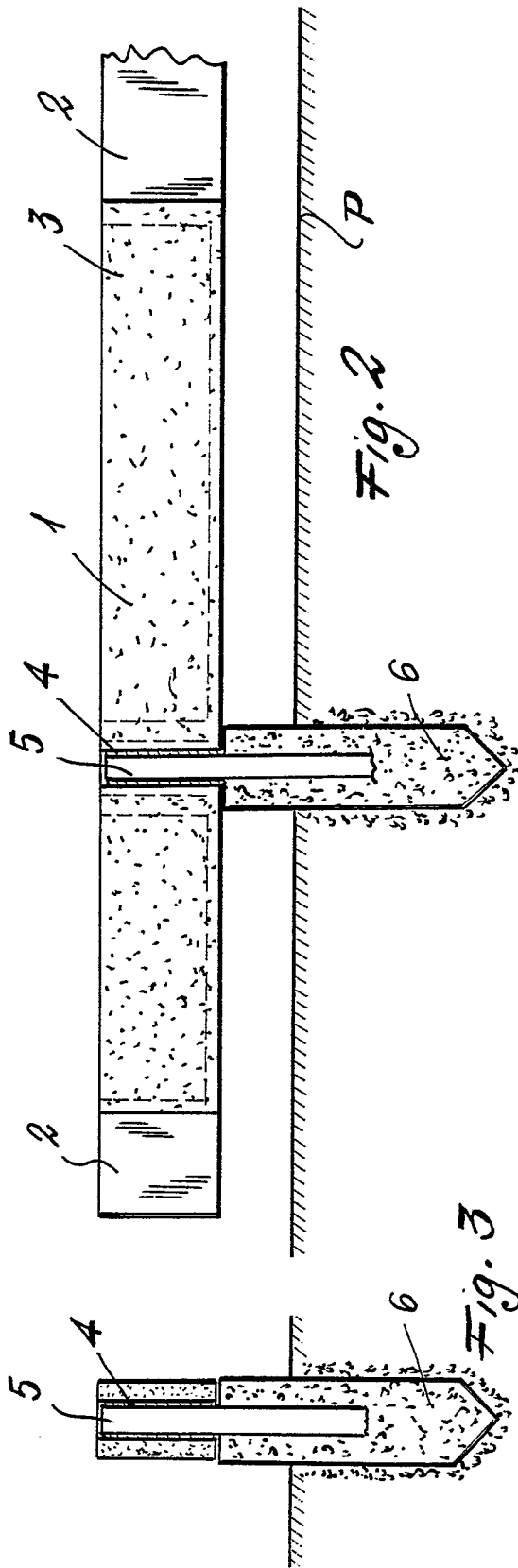
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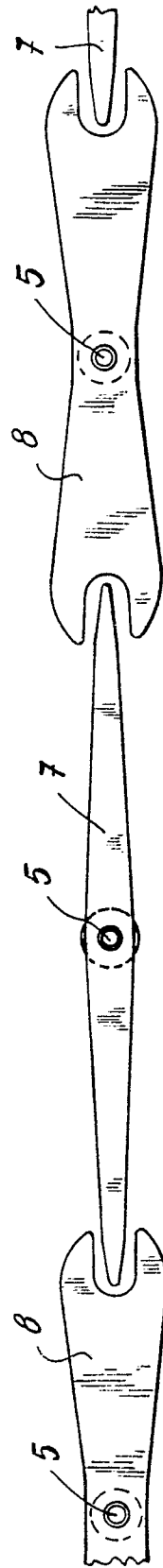


Fig. 4