

July 13, 1965

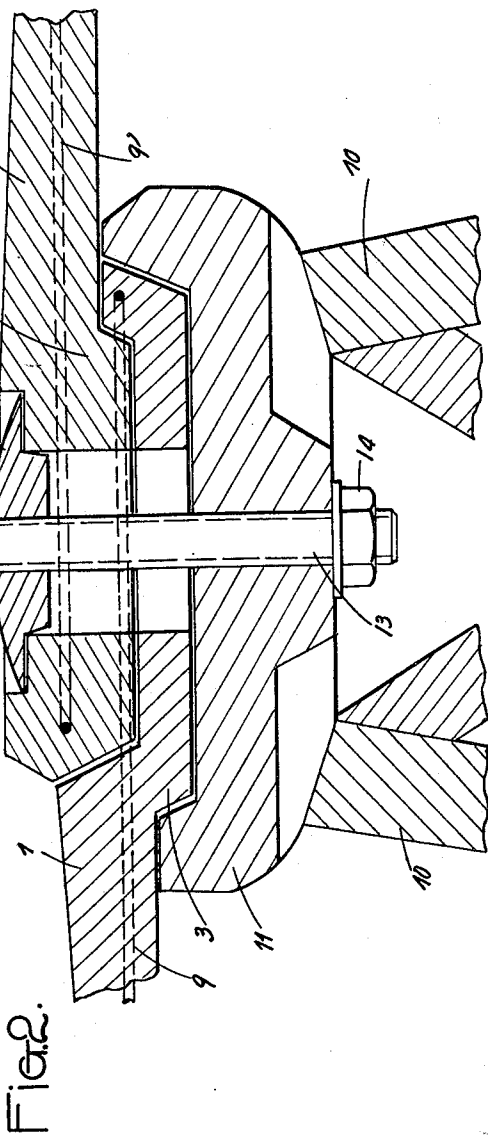
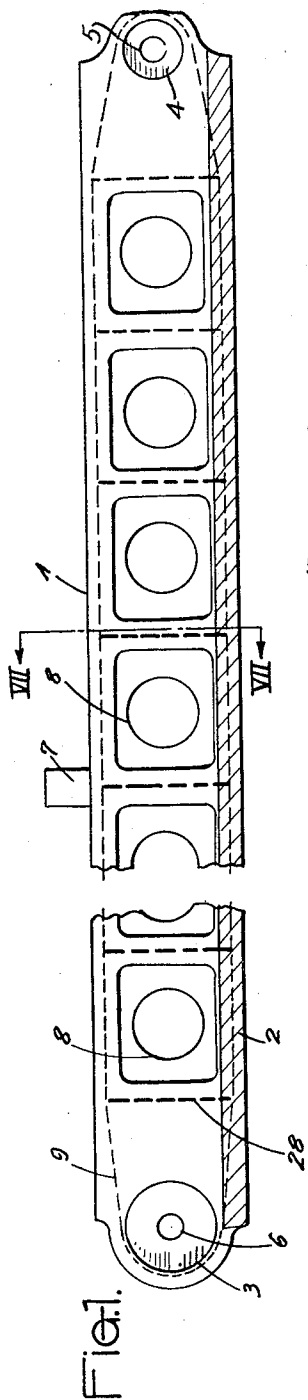
J. JEAN-MARIE JULES GERIN

3,194,537

SAFETY BARRIER FOR ROAD TRAFFIC

Filed July 3, 1962

5 Sheets-Sheet 1



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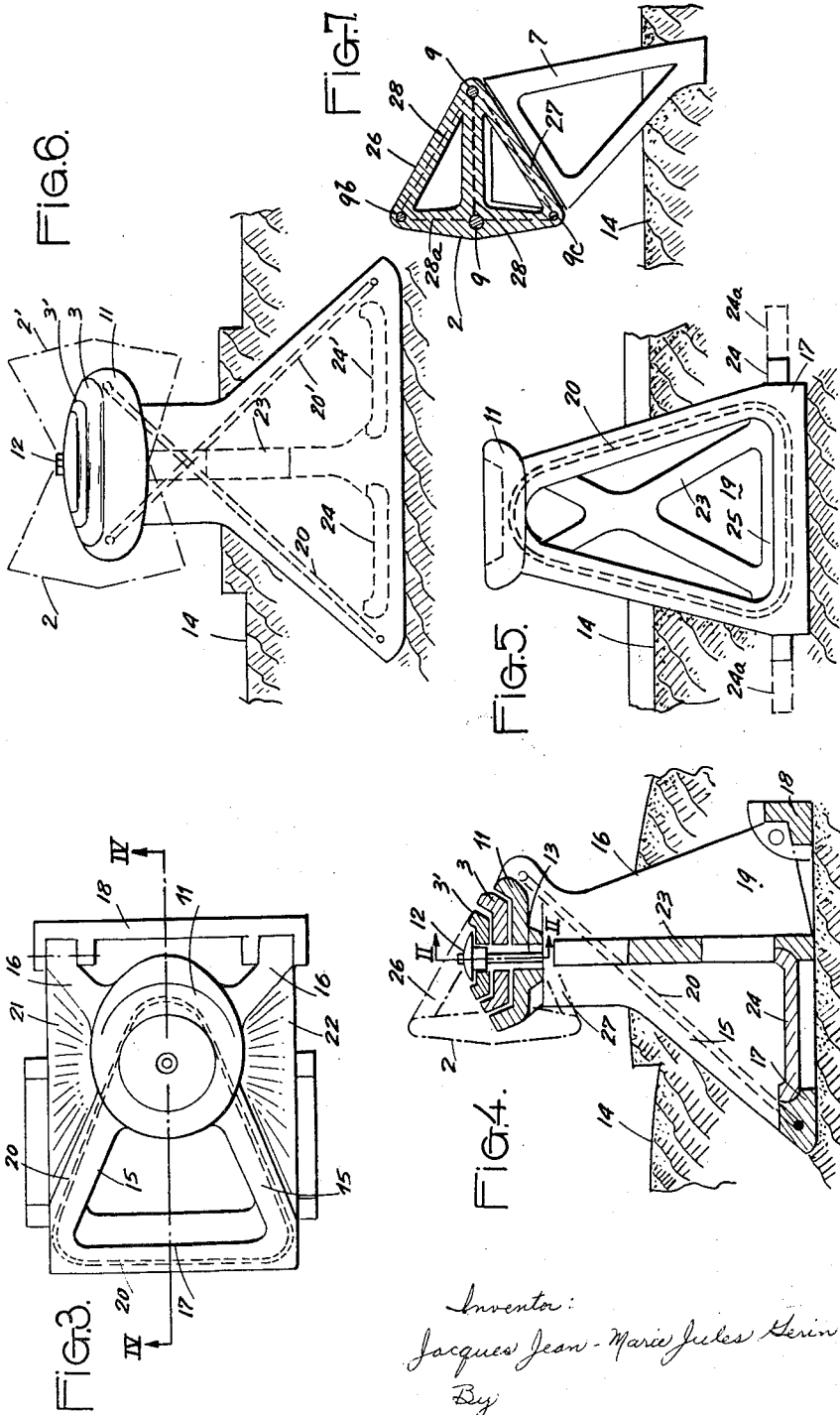
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SAFETY BARRIER FOR ROAD TRAFFIC

Filed July 3, 1962

5 Sheets-Sheet 2



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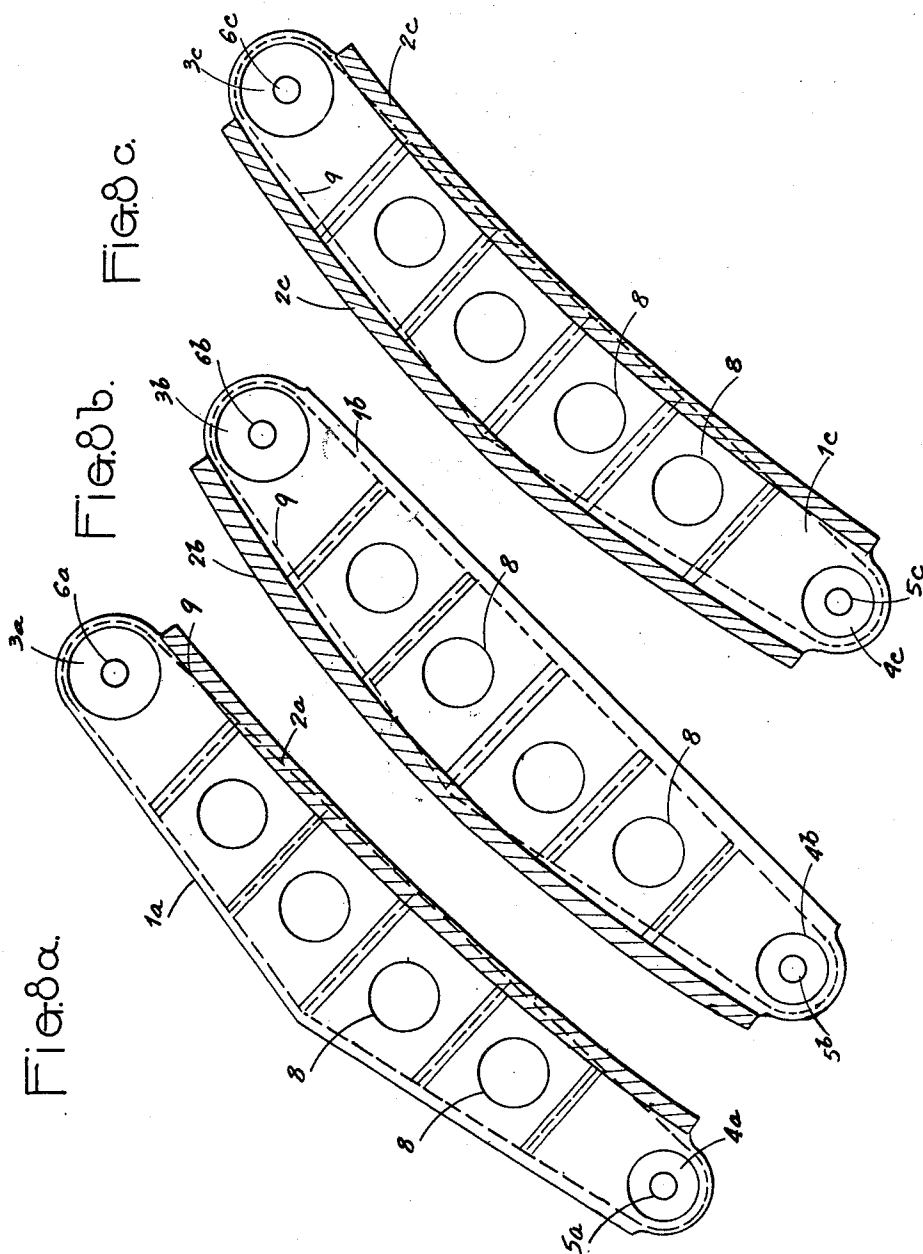
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SAFETY BARRIER FOR ROAD TRAFFIC

Filed July 3, 1962

5 Sheets-Sheet 3



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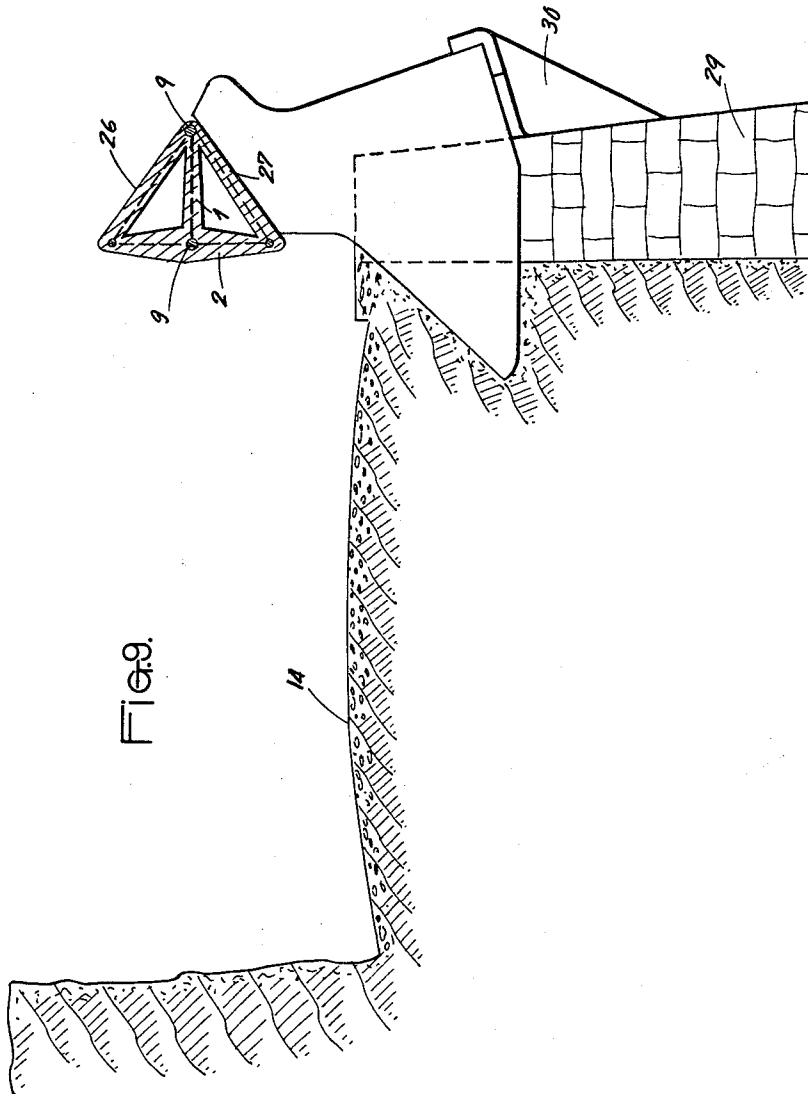
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SAFETY BARRIER FOR ROAD TRAFFIC

Filed July 3, 1962

5 Sheets-Sheet 4



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SAFETY BARRIER FOR ROAD TRAFFIC

Filed July 3, 1962

5 Sheets-Sheet 5

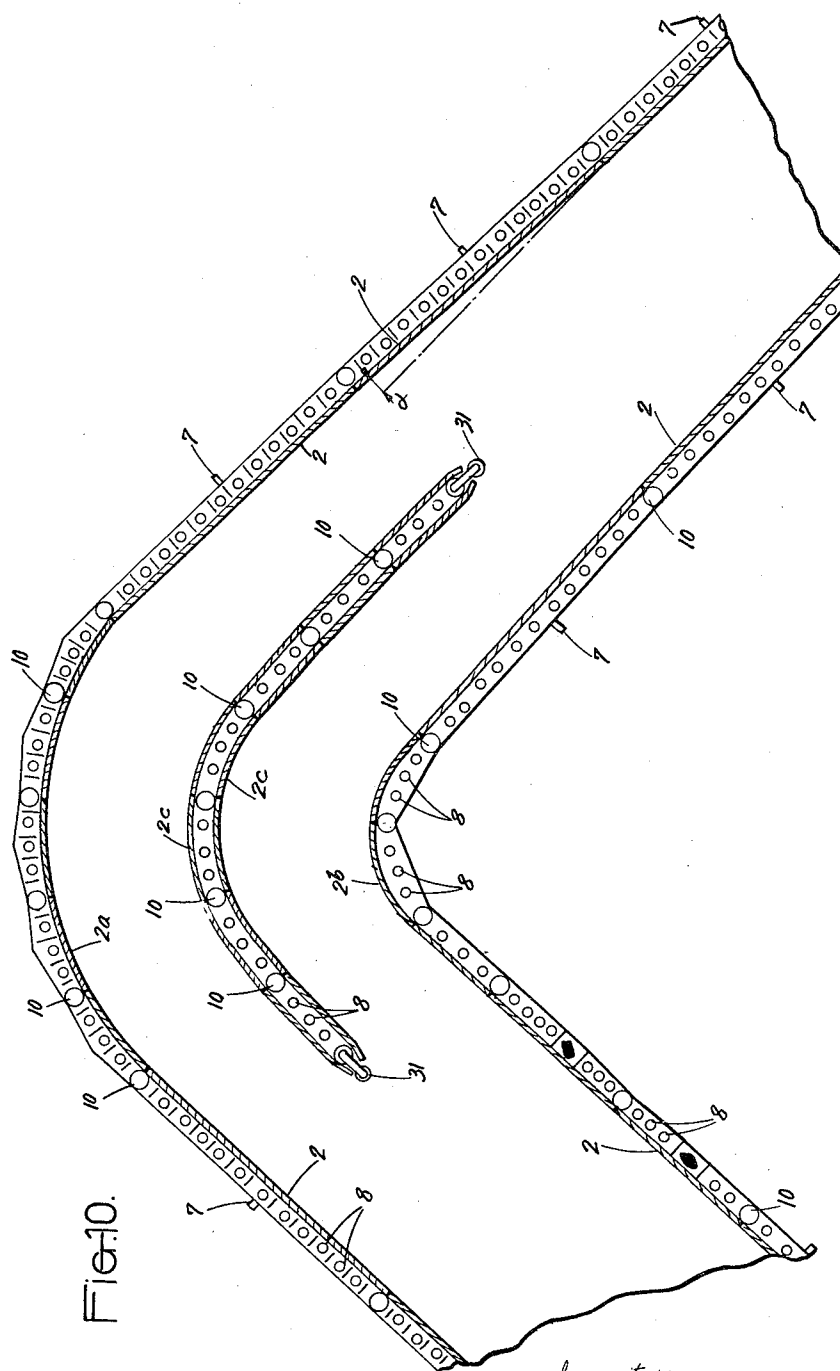


Fig. 10.

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3,194,537

SAFETY BARRIER FOR ROAD TRAFFIC

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Filed July 3, 1962, Ser. No. 207,372

Claims priority, application France, July 4, 1961,
866,905

7 Claims. (Cl. 256—13.1)

The present invention relates to a safety guiding barrier for road traffic, this barrier being formed by elements placed end to end in any number along the roadway, according to requirements, each element being essentially composed of a continuous guiding strip fixed at each of its two extremities to a pillar rigidly anchored in the ground.

It is known that a large number of road accidents are due to the fact that the vehicle has left the road at high speed without the driver being able to prevent it.

Accidents of this kind may occur for various reasons: they are particularly frequent on bends, in spite of the care taken in giving the road at the bends a sufficient inclination to ensure satisfactory road-holding of the vehicle, in theory, even at high speeds. Such accidents may however also taken place on straight portions of the road, not only on gradients but even on the level, as the result of a skid on a slippery surface, an accident with another vehicle, or pure and simple negligence of the driver, resulting from inattention or poor physical condition.

It is already known to install devices on the vehicle itself in order to protect it against collision with another vehicle or with any obstacle (trees or walls for example).

On the other hand, the problem of keeping vehicles on the road has not been studied to any appreciable extent, and while certain relatively effective devices have been proposed for light cars, none of these is suitable for heavy vehicles such as lorries.

It would appear certain that a safety barrier should not be intended to stop the vehicle completely, as this would be liable to have disastrous consequences (in the same way as a collision with a tree or with a strong post), but should on the contrary cause the vehicle to return to the road after sliding, irrespective of the manner in which the impact takes place against the barrier, by the front or by the side of the vehicle. A barrier of this kind should serve as a guide and should not have any discontinuity since it is obviously impossible to foresee at what point the vehicle will be likely to leave the road; the barrier should have no rough portions or projections; it should have a minimum degree of elasticity, since it is quite clear that the problem to be solved is just as much to prevent the vehicle from being seriously damaged as to avoid skids and swerves off the road. Finally, the barrier should be fairly strong so as to be equally effective in the case of heavy vehicles and light cars.

The present invention has precisely for its object a safety guiding barrier having the above combination of qualities, or more particularly a barrier element capable of having slight variations in shape, depending on the place for which it is intended, and which can be readily coupled to an element of the same type, the assembly constituted by a sufficient number of such elements mounted end to end, ensuring the desired safety.

In further detail, the present invention relates to an element of a safety barrier constituted on the one hand by a continuous guiding strip terminated by a loop at each extremity and having at least one smooth vertical wall against which a vehicle which is going off the road strikes and slides along, and, on the other hand, at each extremity of the said guiding strip, by a pillar rigidly anchored in the ground and on which is attached the loop

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of the corresponding extremity of the guiding strip and, when so required, a loop of a further barrier element.

The guiding strip and the pillars are preferably made of concrete in which is embedded a flexible reinforcing armature enabling the concrete to work under tension, for example a metal cable, a chain of any kind, a cable of nylon or any other synthetic material, etc.

The two loops at the extremities of each guiding strip are of unequal size and are designed so that the smaller of the two fits exactly into the larger loop of an adjacent barrier element.

The guiding strip may be straight or curved, depending on whether it is intended for a straight portion of the road or a bend.

Depending on one form of construction suitable for the case in which the safety barrier is installed in the middle of the road, the guiding strip comprises two parallel vertical walls, each being intended for vehicles running in one direction of the traffic.

In the case of a guiding strip of the straight type, one or a number of crutches or supports can be provided so as to prevent the said strip from sagging excessively and so as to enable it to withstand torsional deformations.

Other particular features and advantages of the present invention will become apparent from the description which follows below, made with reference to the accompanying drawings and given by way of explanation only but not in any limitative sense, of various forms of construction of the safety barrier elements according to the invention.

In these drawings:

FIG. 1 shows a horizontal section of a guiding strip according to the invention, of the straight type, this section being taken substantially half way up the height of the vertical wall of said guiding strip.

FIG. 2 is a partial vertical cross-section along II—II of FIG. 4.

FIG. 3 shows a pillar according to the invention, anchored in the ground and seen in plan view.

FIG. 4 is a vertical cross-section along IV—IV of FIG. 3.

FIG. 5 shows the pillar of FIGS. 3 and 4, seen in front view.

FIG. 6 is an end view perpendicular to the road, of a pillar carrying a guiding strip which comprises two vertical walls, this pillar being installed in the centre of the road.

FIG. 7 is a vertical section through VII—VII of FIG. 1 showing the crutch in elevation.

FIG. 8a is a horizontal section similar to FIG. 1, but corresponding to a guiding strip of the curved type, having a vertical wall on its concave portion.

FIG. 8b is a horizontal section similar to FIG. 8a, but wherein the vertical wall is located in the convex portion of the guiding strip.

FIG. 8c is a horizontal section similar to FIG. 8a and 8b, but wherein the guiding strip is provided with a vertical wall both on its convex and on its concave portions.

FIG. 9 is a diagrammatic representation of a pillar according to the invention, mounted at the edge of a mountain road following a ravine, said pillar, with the guide strip in section as in FIG. 7, being orientated with respect to the roadway as in FIG. 4, and

FIG. 10 is a plan view of a road turning comprising three guiding safety barriers constituted by elements according to the invention, these three barriers being installed respectively along the concave portion of the bend, along the convex portion of said bend and in the center of the road.

In FIG. 1, a straight guiding strip element 1 according to the invention has a vertical wall 2 and terminates in two looped portions 3 and 4, of which the central hole 6 or 5 serves for fixing the strip on a pillar. A

crutch support 7 prevents this strip from sagging excessively or from twisting under asymmetrical stresses. Lightning perforations 8 may be provided for the passage of pylons, indicator posts, roots of shrubs, etc.

The guiding strip of the example described is made of concrete and comprises a metal cable reinforcement 9 formed in an endless ring embedded in said guiding strip. This beam is completed by bars or diagonals such as 28.

In FIG. 2, two successive guiding strips 1 and 1' of a barrier according to the invention are fixed on a single pillar 10, of which only the upper portion can be seen, this having the form of a frusto-conical dished member 11 in which is pivotally housed the extremity 3 in the shape of a loop of the strip 1, the upper portion of which is also in the form of a frusto-conical dished member and receives in turn the extremity 3' in the form of a loop of the strip 1' which can pivot therein through a certain angle. The metal cable reinforcement of the strips 1 and 1' is shown at 9 and 9' respectively. A cap 12 which fits over the top of the portion 3' has passing through it a threaded rod 13 clamped by a nut 14.

In FIGS. 3 to 5, in which the elements identical with those of FIGS. 1 and 2 have been given the same reference numbers, the pillar 10 according to the invention is shown anchored in the ground, the portion below the level 14 of the roadway being sharply flared in order to give stability to the assembly.

This concrete pillar is constituted by two sections 15 and 16 of substantially trapezoidal shape, of which the large base (17 and 18 respectively) rests on the bottom of the cavity 19 dug in the ground for installing the pillar. The section 15 which is directed to the side of the road, is reinforced with a continuous metal cable 20 in the form of a closed ring strongly anchored in the large base 17, and which passes along the dished portion 11 of the side opposite to the roadway so as to give strength to the pillar in the event of a vehicle colliding with the vertical wall 2. The two sections which start from the dished member 11, are joined together laterally by full walls 21 and 22.

The pillar is reinforced by a triangulated central portion 23 in the shape of an X. A plate 24 is inserted in the grooves of the base 17 and of the horizontal member 25 of the X-shaped wall. When the assembly has been installed, this plate 24 is covered with earth up to the level 14 of the roadway and the mass of earth thus accumulated gives a better seating for the pillar. The plate 24 is of variable length; it may extend considerably from the terminal as shown at 24a, so as to be adapted to the more or less stabilized condition of the ground.

FIG. 6 is quite easily understood. Because the pillar shown is mounted in the centre of the road, it is composed of two halves which are symmetrical with respect to the X-shaped member 23, each of these halves being identical with the portion of the simple pillar of FIG. 4 which is comprised between the roadway and the X-shaped member 23 (the references of the elements of the right-hand half of FIG. 6, symmetrical with those of the left-hand half, have been given a prime sign).

The guiding strip 1, pierced with weight-reducing perforations 8 (see FIG. 1) is reinforced by a series of buttresses such as 26 and 27 (FIG. 7) arranged at intervals over its whole length, and on which the vertical wall 2 is fixed.

A metal reinforcing device constituted by an endless cable 9b and 9c and a grid 28a supported on 9, 9b and 9c, reinforce the vertical wall 2 of the guiding strip. The buttresses 26 and 27 are also provided with a reinforcement 28 of metal rods. They transfer the stresses due to shocks which are produced on the upper or lower edges.

FIG. 7 shows a crutch support 7 buried in the ground, and on which rest the lower buttresses of the guiding strip 2.

In FIGS. 8a, 8b and 8c, the elements identical with those of FIG. 1 have been given the same reference numbers with the addition of the indices a, b and c. The curved guiding strip 8c, which is intended to be installed in the centre of a road and to be fixed to double pillars of the type shown in FIG. 6, comprises two vertical walls 2c, one for each direction of travel of the vehicles.

In FIG. 9, which corresponds to the case in which the safety barrier according to the invention is installed at the edge of a mountain road following a ravine, each pillar is mounted in a special manner so as not to take up any of the width of the roadway. The pillar is included in the retaining wall 29, and by virtue of a suitable support 30 it can be fixed so that the vertical wall 2 does not encroach on the roadway, its central plane being then almost vertically above the outer side of the wall 29.

In FIG. 10 the safety barriers in a turn are constituted by elements identical with those of FIGS. 8a, 8b and 8c; they are extended by straight guiding strips of the same type as that of FIG. 1, supported by crutches 7.

The operation of the safety barriers constituted by elements in accordance with the invention will readily be understood with the help of the description already given above:

The metal cables or the like, embedded in the guiding strips and in the pillars, give the elements according to the invention a flexibility, a strength and an elasticity from which they derive all their effectiveness.

When a vehicle strikes the vertical wall 2 of an element, the compression stress is converted to a tensile stress in the direction of the length of the guiding strip. This tensile stress is transmitted through the intermediary of the attachments on the two end pillars successively to a certain number of other guiding strips.

The method of fixation of the extremities of the guiding strips in the frusto-conical dished member 11 of a pillar leaves a fairly considerable latitude for the orientation of the guiding strips with respect to each other, which enables the safety barrier to follow the shape of the road and, for example, to be adapted to a sudden widening of the road, as shown in FIG. 10, in which the vertical wall 2 of one of the elements makes an angle α with the vertical wall of the adjoining element.

As indicated above, the two extremities in the shape of a frusto-conical dished member of each guiding strip are of unequal dimensions and are designed so that one extremity 3' of one guiding strip fits exactly into the extremity 3 of the guiding strip following.

As can be seen from FIGS. 3, 4, 5, 6, 7 and 9, between the level 14 of the roadway and the lower edges of the vertical walls 2, there is a wide passage permitting the evacuation of water, snow, etc., and for cleaning the road, cutting grass, etc.

In the case of a barrier installed in the centre of the road, each of the two end pillars could constitute a dangerous obstacle for vehicles. It is thus advisable to install in front of each of these pillars according to the invention, a pillar 31 with a rotating drum, this pillar being furthermore provided with indicator devices (lamp, winking light, reflector, etc.).

The same provision can be made on the vertical wall of each element according to the invention and on the pillars, which can be provided with housings intended to receive reflectors or any other required indicator. The vertical walls can be given any useful indicator sign (for example painted strips indicating a turn, etc.).

Finally, the guiding strips 1 can be provided so as to be suitable for roads bordered with trees very close to the roadway. In this case (as shown in the lower left-hand portion of FIG. 10, in which the black circles represent trees), the strip 1 comprises at its centre a housing for a tree, and the portions of the strip 1 on each side of the tree are each provided with a metal cable reinforcement. As in the case of the ordinary guiding strips, the vertical wall extends from one pillar to the other and

passes in front of the tree; a removable frame surrounds the tree.

An important feature of the invention resides in the fact that with a small number of pre-fabricated elements it is possible to follow the outline of any road, a great flexibility of erection enabling each guiding strip to be orientated as desired, whether it is of the straight or curved type, by virtue of the assembly in the two frusto-conical dished members of the pillar itself on the one hand, and on the other hand of the first extremity 3 of the strip, the desired orientation being effected before the cap 12 is clamped down by the threaded rod 13.

During the course of a violent shock on the strip, the latter sags very considerably, which results in a torsion stress in the horizontal plane.

This torsion is not transmitted to the pillar since the assembly on the frusto-conical portions permits a rotation in spite of the clamping effect of the threaded rod 13.

While the anchorage of the pillars in the ground necessitates fairly considerable earth works which may be costly, on the contrary, since the pillars can be placed at a fairly large distance from each other (except on bends), the cost price of installation is fairly small.

It will of course be understood that the present invention has been described above by way of explanation only and not in any limitative sense, and that any modifications of detail can be made without thereby departing from its scope.

I claim:

1. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a cable reinforcement formed in an endless ring embedded in each of said guiding strips, a pillar rigidly anchored in the ground at each extremity of each of said strips, the underground portion of each of said pillars being sharply flared in order to give stability, each of said pillars comprising two sections, one of which is directed towards the roadway and reinforced with a metal cable in the form of an endless ring, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip, and the upper part of said metal cable being located along said dished member on the side opposite to the roadway and the lower part of said metal cable embedded in the base of said pillar adjacent to the roadway whereby each pillar is imparted strength in the event of a vehicle colliding with said vertical wall of the guiding strip.

2. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a cable reinforcement formed in an endless ring embedded in each of said guiding strips, a pillar rigidly anchored in the ground at each extremity of each of said strips, the underground portion of each of said pillars being sharply flared in order to give stability, each of said pillars comprising two sections of substantially trapezoidal shape, one of which is directed towards the roadway and reinforced with a metal cable in the form of an endless ring, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip, and the upper part of said metal cable being located along said dished member on the side opposite to the roadway and the lower part of said metal cable embedded in the base of said pillar adjacent to the roadway whereby each pillar is imparted strength in the

event of a vehicle colliding with said vertical wall of the guiding strip.

3. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a cable reinforcement formed in an endless ring embedded in each of said guiding strips, a pillar rigidly anchored in the ground at each extremity of each of said strips, the underground portion of each of said pillars being sharply flared in order to give stability, each of said pillars comprising two sections of substantially trapezoidal shape and a reinforcing triangulated central portion, one of which is directed towards the roadway and reinforced with a metal cable in the form of an endless ring, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip, and the upper part of said metal cable being located along said dished member on the side opposite to the roadway and the lower part of said metal cable embedded in the base of said pillar adjacent to the roadway whereby each pillar is imparted strength in the event of a vehicle colliding with said vertical wall of the guiding strip.

4. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a cable reinforcement formed in an endless ring embedded in each of said guiding strips, a pillar rigidly anchored in the ground at each extremity of each of said strips, the underground portion of each of said pillars being sharply flared in order to give stability, each of said pillars comprising two sections of substantially trapezoidal shape and a reinforcing triangulated central portion, one of which is directed towards the roadway and reinforced with a metal cable in the form of an endless ring, a plate located in the base of said latter section and in grooves of said triangulated central portion, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip, and the upper part of said metal cable being located along said dished member on the side opposite to the roadway and the lower part of said metal cable embedded in the base of said pillar adjacent to the roadway whereby each pillar is imparted strength in the event of a vehicle colliding with said vertical wall of the guiding strip.

5. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a pillar rigidly anchored in the ground at each extremity of each of said strips, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip.

6. A safety barrier for road traffic comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a pillar rigidly anchored in the ground at each extremity of each of said strips, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped

portion of an adjacent guiding strip, and each of said pillars comprising two sections of substantially trapezoidal shape and a reinforcing triangulated central portion and being symmetrical with respect to said central portion.

7. A safety barrier for road traffic along a mountain road comprising concrete guiding strips each having at least one vertical wall and terminating in first and second horizontal dish shaped portions, a pillar rigidly anchored in the ground at each extremity of each of said strips, each of said pillars being, at the upper portion thereof, in the form of a dished member pivotally receiving said dish shaped portions of said guiding strips, said dish shaped member receiving in nesting relationship said first horizontal dish shaped portion of one guiding strip and said second horizontal dish shaped portion of an adjacent guiding strip, each of said pillars comprising two sections of substantially trapezoidal shape and being included in the retaining wall of the mountain road, a support for said pillar fixed to the retaining wall whereby the vertical wall of each of said guiding strips does not encroach on the roadway.

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