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3,082,994

SAFETY FENCE FOR MOTORWAYS

Filed Oct. 9, 1961

2 Sheets-Sheet 1

Fig. 2

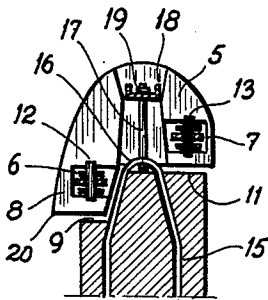


Fig. 1

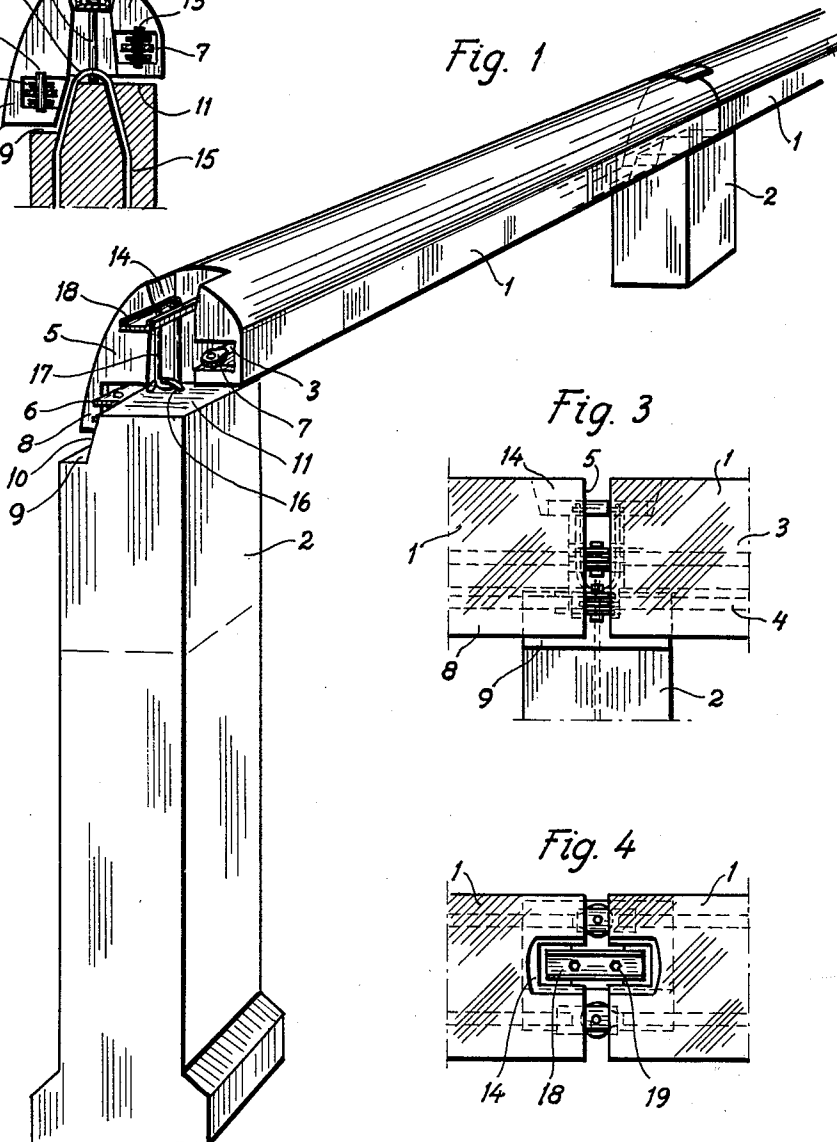


Fig. 3

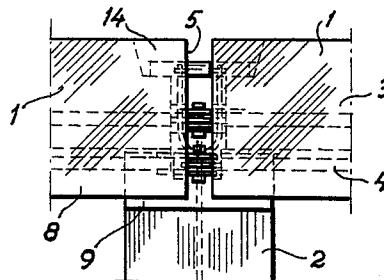
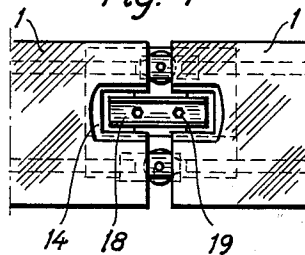


Fig. 4



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Fig. 6

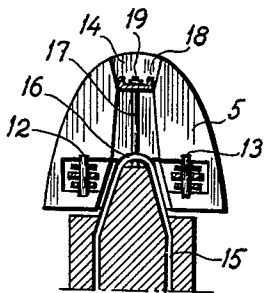


Fig. 5

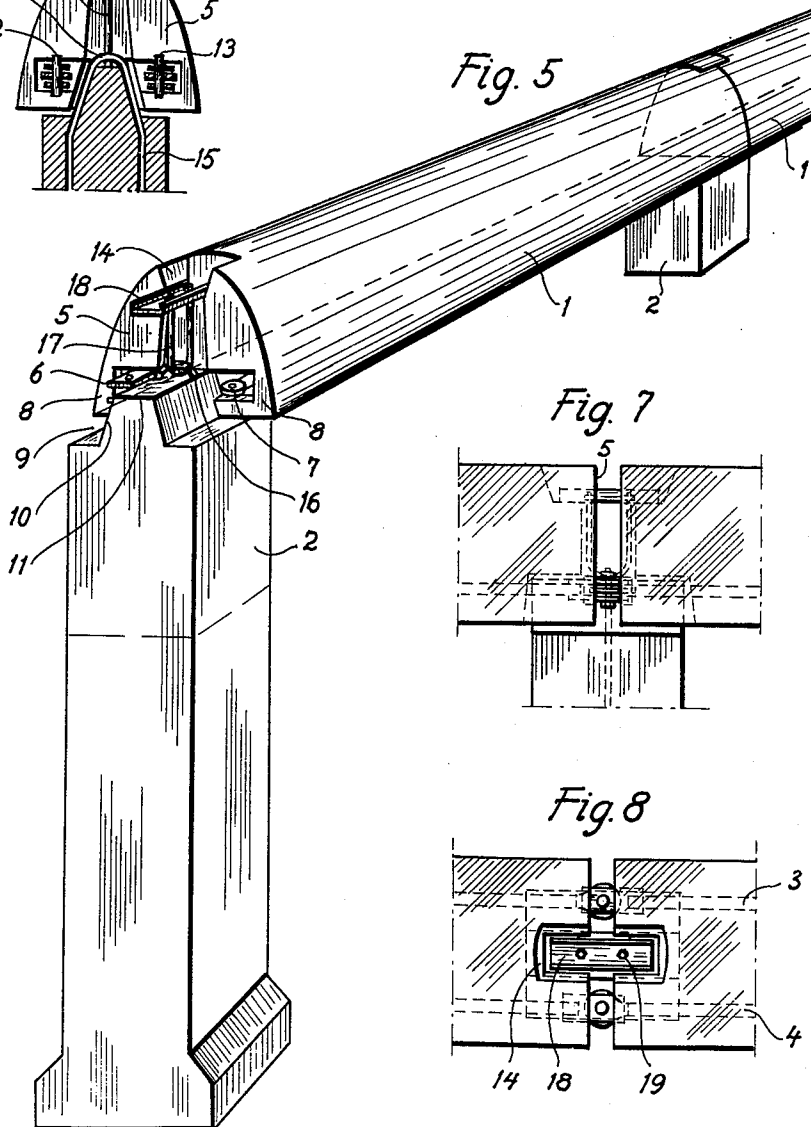


Fig. 7

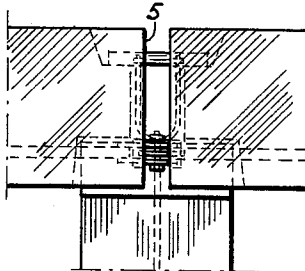
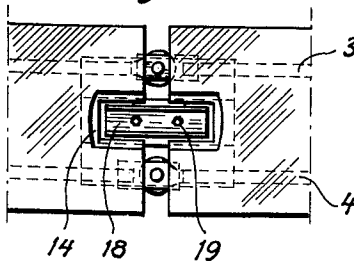


Fig. 8



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SAFETY FENCE FOR MOTORWAYS

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5 Claims. (Cl. 256-13.1)

This invention relates to a safety fence for motorways, consisting of a plurality of reinforced concrete beams arranged in extension of each other, their ends resting on pillars fastened in the side of the roadway.

It is the object of the invention to provide new and improved means for assembling and mounting such safety fences.

The invention is more particularly concerned with safety fences in which the beams are provided with longitudinal reinforcement bars having eyes projecting from the ends of the beams and assembled at the abutting joint of the beams on top of a pillar so as to provide an unbreakable chain structure of the reinforcement bars in the beams.

It is the object of the invention to provide such retaining and assembly means that the load produced by collision with the fence can be received by the fence in the most suitable manner with minimum risk of fracture of the fence and maximum possibilities of repairing it after the collision at a minimum of expense.

It is a further object of the invention to provide a safety fence having the best possibility of catching a colliding motor vehicle so as to limit the accident to the widest possible extent without the cost of manufacturing, mounting and maintaining the safety fence exceeds what must be considered reasonable for such precautionary measures.

It is a further object of the invention to provide assembly means that can be produced at a low cost and are easy to assemble and dismantle, simultaneously with such means making it possible to form a continuous steel chain in the concrete beams and permitting a limited relative movement between the beams and the pillars, which is of importance both when mounting the fence and on collision.

It is a further object of the invention to provide means for assembling and mounting a safety fence which is suitable both as a single-acting safety fence placed in one side of a motorway and as a double-acting safety fence placed on the motorway proper between two roadways.

In accordance with the invention a safety fence for motorways consists of a plurality of reinforced concrete beams provided in extension of each other with their ends connected end to end relation by means of pins which engage eyes provided at the ends of longitudinal reinforcement bars in either side of the beams, the assembled ends of any two beams resting on the upper end of a pillar which is fastened in the roadside and secured to one or more upward-facing contact surfaces of the pillar by means of a U-shaped clamp placed in the space between the end surfaces of the beams between the reinforcement bars in a vertical longitudinal plane of the beams, the legs of the clamp extending upwards through holes in a longitudinally disposed retaining plate, which rests at the bottom of a recess provided in the upper side of each beam near the legs of the clamp, and having clasp nuts on the upper side of the retaining plate, whereas the central part of the clamp engages a member which extends above the top of the pillar and is a part of a reinforcement bar in the pillar located in a plane at right angles to the longitudinal direction of the beams.

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Further objects of the invention and advantages of the means referred to will be evident from the following description of various embodiments of a safety fence for motorways.

5 In the drawing FIGURE 1 shows a safety fence, viewed in perspective, some parts being removed,

FIGURE 2 is a vertical section through a pillar for a safety fence according to FIGURE 1,

FIGURE 3 is a part of the safety fence according to FIGURE 1, viewed from the front, at a point of assembly,

FIGURE 4 is the same as in FIGURE 3, viewed from above,

FIGURE 5 is a safety fence for motorways, showing another embodiment according to the invention, viewed in perspective with certain parts removed.

FIGURE 6 is a vertical section through a pillar for a safety fence according to FIGURE 5,

FIGURE 7 is a part of the safety fence according to FIGURE 5, viewed from the front, and

FIGURE 8 is the same as is shown in FIGURE 7, viewed from above.

The safety fence according to FIGURE 1 consists of a plurality of oblong concrete beams 1 provided in extension of each other, resting on pillars 2 that may be embedded in the ground or fastened in other manner along the side of the motorway. In each beam 1 are provided two longitudinal reinforcement bars 3 and 4, projecting from the end surface 5 of the beam and provided with eyes 6 and 7.

As is evident from FIGURE 1, there is a reinforcement bar in either side of the beam, which on the side facing the roadway has a downwardly extending longitudinal projection 8 in which one reinforcement bar 4 is placed.

The beams 1 are mounted with their end surfaces 5 at a certain distance of each other on the pillars 2 which have a recess 9 to receive the projection 8 so that the back of the projection 8 is brought to rest against a forwardly facing, oblique surface 10 of the pillar. The underside of the beam 1 is, incidentally, resting on an upwardly facing horizontal surface 11 of the pillar. After the beam has been mounted in position connecting pins 12 and 13 are introduced in the eyes 6 and 7 so that the reinforcement bars 3 and 4 are connected to form a continuous chain in the front and rear sides of the beams.

On their upper side the beams 1 have at either end a recess 14 with a flat horizontal bottom. The said bottom serves as retaining surface for the retaining means described in the following, for securing the beams to the pillars.

In each pillar is provided a double reinforcement bar 15 which forms a bow or clamp located in a plane substantially at right angles to the longitudinal direction of the beams 1 and the upper part 16 of the clamp projects above the surface 11 so as to form an eye. The said eye is engaged by a clamp 17 the legs of which are located in a plane extending in the longitudinal direction of the beams, their position being substantially vertical in the centre of the beams. The ends of the legs of the clamp 17 are passed through holes in a retaining plate 18 resting on the bottom surfaces of the recesses 14 of two adjoining beam ends and on the threaded ends of the clamp legs are screwed nuts 19 by means of which the retaining plate 18 may be securely fastened to the bottom of the recesses 14, thus securely retaining the beams to the surface 11 of the pillar.

As will be evident from the drawing, the retaining means described constitute a linked connection or a

hinge permitting the two adjoining beams to turn in several directions in relation to each other and in relation to the pillar, which is essential, both for mounting the fence and in case of collision. It is here of importance that the two clamps are formed and placed in relation to each other as described, that is, one of them is lying in a plane substantially through the vertical longitudinal centre plane of the beams, whereas the other one is located in a plane substantially at right angles thereto, midway between the ends of the beams. This lost motion connection interconnecting the ends of two adjacent beams and an associated pillar combined with the fact that the two reinforcement bars 3 and 4 are not connected with the pillar provides the said advantageous movability of the two steel chains in relation to the pillars, so that both turning of the two beams in relation to each other, twisting of the beams and a lost motion or a displacement of the beams in relation to the pillars can take place within certain limits without the concrete material of the beams and the pillars being crushed. Furthermore, the parts can be mounted without difficulty, even though the pillars have not been arranged in truly correct relation to each other.

The space between the end walls of the beams and the recesses 14 is filled, after mounting of the beams, with a comparatively weak concrete, which will break readily on a collision so that it will not prevent the aforesaid movability between the parts, and the said concrete filler can easily be removed if the fence is to be dismantled for repairs. The said filler also protects the connecting and engagement means and adds an attractive appearance to the safety fence.

The safety fence shown in FIGURES 1-4 is intended for arrangement in one side of the motorway so that the side of the beams 1 which is provided with the projection 8 faces the roadway, thus forming a comparatively wide upwardly and rearwardly curved deflecting surface for the wheels of the motor cars and an edge 20 located at such a distance above the roadway that maximum deflecting effect is obtained. The said edge 20 is located below

A safety fence according to FIGURES 5-8 is intended for arrangement between two roadways, thus acting double-sidedly, and for this purpose the beams 1 are provided with downwardly extending projections 8 in either side of the beams, thereby providing a comparatively high, curved deflecting surface on either side. Thus, the fence is capable of intercepting vehicles from either side.

Apart from this distinction the design is like that described in the case of FIGURES 1-5. As appears from FIGURES 5 and 6, the two reinforcement bars are located at the same level, that is, there is a reinforcement bar in each projection 8. Correspondingly, the pillars have two recesses 9 in either side to form contact surfaces 10 for the backs of the two longitudinal projections 8.

The individual structural components in FIGURES 5-8 are denoted by the identical reference numerals as in FIGURES 1-5, being designed in corresponding manner and further explanation of the design according to FIGURES 5-8 should be unnecessary since, apart from the said modifications, it is exactly as the design disclosed in FIGURES 1-4.

What I claim and desire to secure by Letters Patent is:

1. A safety fence for motor ways comprising at least three spaced pillars, at least one beam bridging adjacent pairs of pillars, interconnecting means between each beam and its next adjacent beam and lost motion means interconnecting adjacent ends of two of said beams and one of said pillars.

2. A safety fence for motor ways comprising at least three spaced pillars, at least one beam bridging adjacent pairs of pillars, first means interconnecting each beam and its next adjacent beam, a second means operatively connected with each beam and its next adjacent beam, a third means connected to each pillar

and the second and third means being interengageable to permit a limited lost motion of the beams relative to the pillars.

3. A safety fence for motor ways comprising at least three spaced pillars, at least one beam bridging adjacent pairs of pillars, means for interconnecting each beam and its next adjacent beam in end to end relation, each pillar provided with an inverted U-shaped member embedded therein, each inverted U-shaped member having leg portions lying in a plane substantially transversely relative to the beams and having the curved portion thereof projecting above a top surface of the pillar and between the end faces of adjacent beams, retaining plates bridging the ends of adjacent beams having the ends thereof resting on bottom surfaces of recesses provided at the ends of the beams, U-shaped connecting members each having leg portions lying in a longitudinal plane relative to the beams, the lower ends of each U-shaped connecting member engaging the curved portion of an inverted U-shaped member and the U-shaped connecting members having leg portions operatively connected to the retaining plates.

4. A safety fence for motor ways comprising at least three spaced pillars, each pillar having an upper top plane surface, an inclined surface extending downwardly and outwardly from the upper top plane surface and a lower top plane surface at the bottom of the inclined surface, at least one reinforced concrete beam bridging adjacent pairs of pillars, each beam having a downwardly projecting portion extending longitudinally the length thereof, the downwardly projecting portion of the beams having a downwardly and outwardly inclined surface corresponding to the downwardly and outwardly inclined surface on each pillar, the beams bridging the pillars so that the downwardly and outwardly surfaces of the beams contact the downwardly and outwardly inclined surfaces of the pillars, the beams having longitudinally disposed, embedded reinforcing members projecting outwardly from the end faces thereof, the ends of the reinforcing members in the beams having eyelets registering with eyelets formed at the ends of adjacent beams, locking pins inserted in registering eyelets, each pillar being provided with an inverted U-shaped member embedded therein, each inverted U-shaped member having leg portions lying in planes substantially transversely relative to the beams and having the curved portion thereof projecting above the upper top plane surface of the pillar and between the end faces of adjacent beams, retaining plates bridging the ends of adjacent beams having the ends thereof resting on the bottom surfaces of recesses provided at the ends of the beams, U-shaped connecting members each having leg portions lying in a longitudinal plane relative to the beams, the lower end of each U-shaped connecting member engaging the curved end portion of an inverted U-shaped member and the U-shaped connecting members having leg portions operatively connected to the retaining plates.

5. A safety fence for motor ways comprising at least three spaced pillars, each pillar having top surfaces comprising an upper plane surface, a pair of inclined surfaces extending downwardly and outwardly from the upper surface and a pair of lower plane surfaces at the bottom of the inclined surfaces, at least one reinforced concrete beam having bottom surfaces substantially conforming to the top surfaces of the pillars bridging adjacent pairs of pillars, the beams having longitudinally disposed, embedded reinforced members projecting outwardly from the end faces thereof, the ends of the reinforcing members in the beams having eyelets registering with eyelets formed at the ends of reinforcing members in adjacent beams, locking pins inserted in registering eyelets, each pillar being provided with an inverted U-shaped member embedded therein, each inverted U-shaped member having leg portions lying in a plane substantially transversely relative to the beams and having the curved portion thereof projecting above the upper plane surface

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of the pillar and between the end faces of adjacent beams, retaining plates bridging the ends of adjacent beams having the ends thereof resting on bottom surfaces of recesses provided at the ends of the beams, U-shaped connecting members each having leg portions lying in a longitudinal plane relative to the beams, the lower ends of each U-shaped connecting member engaging the curved end portion of an inverted U-shaped member and each U-shaped connecting members having leg portions operatively connected to a retaining plate.

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