Aug. 8, 1933. L. H. MILLER 1,921,129

HIGHWAY GUARD

Filed April 4, 1931

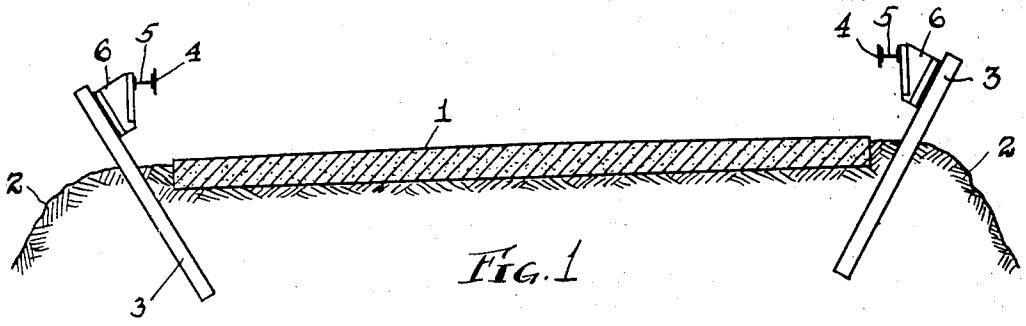


FIG. 1

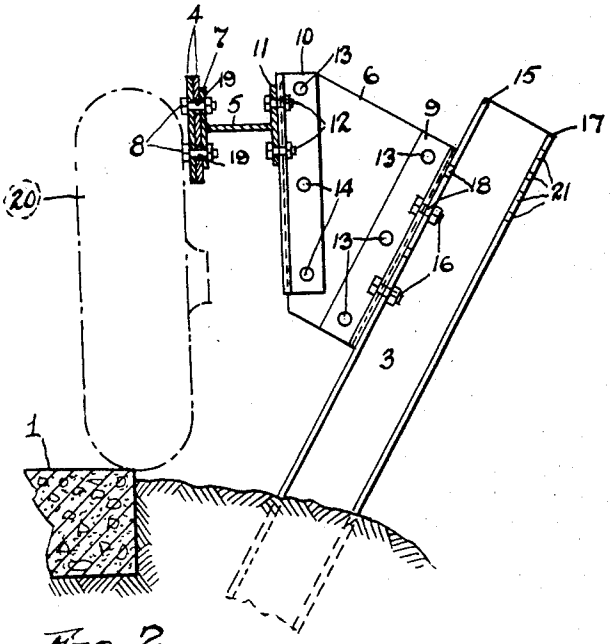


FIG. 2

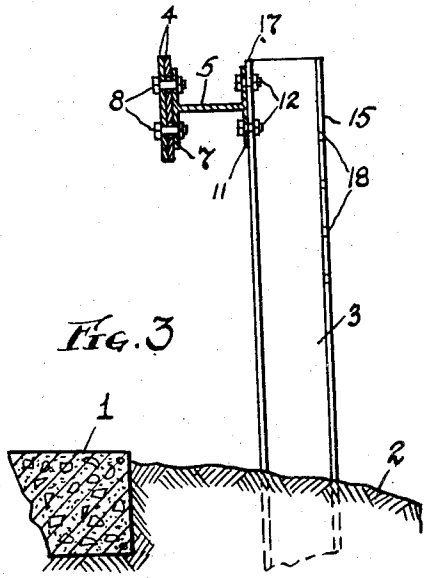


FIG. 3

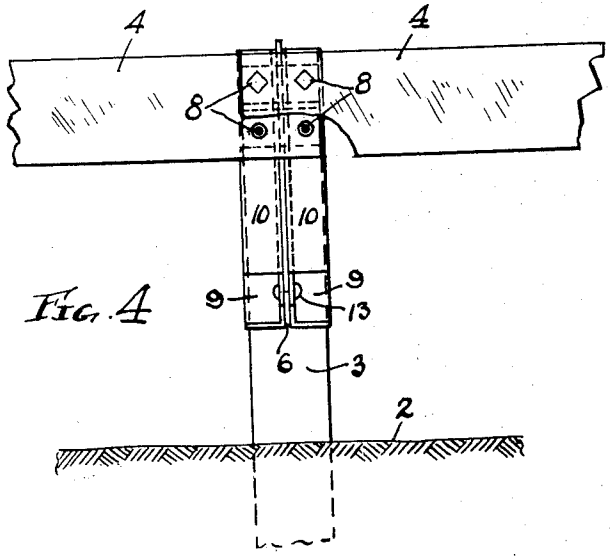


FIG. 4

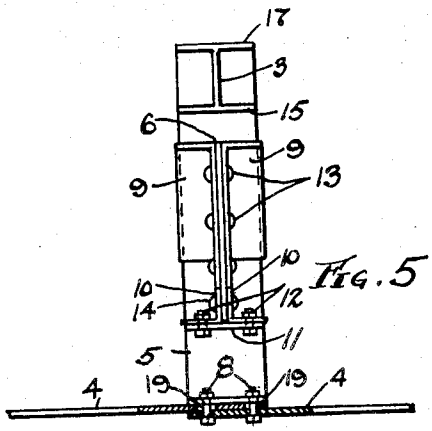


FIG. 5

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HIGHWAY GUARD

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Application April 4, 1931. Serial No. 527,711

9 Claims. (Cl. 256—13.1)

The present invention, relating as titularly indicated to highway guards, pertains more particularly to a form of construction of guard rail composed preferably of steel or metallic members. The types of highway guards which have been previously utilized have been in the form of a simple fence construction such as wire cables supported by wooden posts, wooden rails and wire fencing supported by vertical wooden posts. Contacts or collisions with such guard rails as have been heretofore used were productive of the direst and most destructive consequences to both the vehicle and the guard rail.

The general object and nature of my invention is to provide a guard of maximum strength which shall insure increased safety in case of collision with highway vehicles, and having a form of construction which is susceptible of the most economical repair and replacement in case of destructive deformation. It is a further object of the invention to provide means for adjustably regulating the height of the rail plate from the road bed or pavement. Other advantages shall become apparent as the description proceeds. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is an elevational view more or less diagrammatic showing the guard rail embodying the principle of my invention in position on a highway; Fig. 2 is a fragmentary elevation greatly enlarged of one of the guards shown in Fig. 1; Fig. 3 is an elevational view partly in section of an alternative form of guard rail construction; Fig. 4 is an elevation taken at right angles to Fig. 2; and Fig. 5 is a plan view of the construction illustrated in Fig. 4.

Referring more particularly to Fig. 1, the pavement or roadway 1 which is bounded by the shoulders 2 of the road bed has the supporting posts 3 placed along its edge. The latter support posts 3 in the particular view shown in Fig. 1 are positioned at an angle inclined from the vertical in order that they may possess a more rigid foundation where the road shoulders are soft or narrow. The guard rail proper is composed of a flat steel plate 4 which is carried by the I-beam section 5 at a distance substantially removed from the supporting members. Where the support posts 3 are placed in the inclined position, it becomes necessary to employ an angle bracket 6 in order to carry the railplate in vertical position.

The specific construction of my device as revealed in Fig. 2 shows the rail bars 4 secured to the flange 7 of the I-beam section 5 by means of the bolts 8. The angle bracket 6 carries upon its base and hypotenuse, the angle irons 9 and 10 which are secured thereto by the rivets 13 and 14 respectively. The rail-carrying I-beam section 5 has its flange 11 secured to the angle irons 10 of the bracket 6 by means of the bolts 12. The support member 3 is preferably in the form of an H-beam with a plurality of holes 18 positioned in one of its flanges 15 in order that the relative height of the angle bracket 6 may be adjusted thereon by means of the bolts 16.

In an alternative form of construction as illustrated in Fig. 3 where it is desirous to place the support posts 3 in a perpendicular rather than an inclined position, the angle bracket 6 may be dispensed with. In the latter form of construction the rail-carrying I-beam section 5 is secured directly to the flange 17 of the H-beam by means of the bolts 12.

As is shown in Fig. 2, the rail bar is carried at such a height as to contact with the upper circumference of the wheels or ties 20 of highway vehicles. Furthermore, by means of utilization of the rail-carrying I-beam section 5, it is possible to position the rail bar at a distance substantially removed from the supporting elements, so that any lateral projections upon passing vehicles will not contact with such supporting members. The initial point of contact therefore of highway vehicles will occur between the laterally extending rail bar and the upper portion of the wheels of highway vehicles. In this manner it is possible to prevent a great number of serious accidents by virtue of the fact that the vehicles will be deflected back into their normal course upon the roadway with a minimum injury to both the vehicle and the highway rail guard.

It will thus be seen that the above described type of guard rail construction, pursuant to the principle of my invention, provides a plurality of shock-absorbing elements consisting of: the resilient rail guard 4 itself, the web 5 of the I-beam supporting piece, and the web 6 of the angle bracket. The loose fitting large diameter rail guard holes 19 also serve to function as a shock-absorbing element. The frictional force

exerted by the securing bolts 8 upon the surface of the rails 4 operates as a means for absorbing resilient transverse stresses which are caused by flexure of the medial portions of the guard rails. The webs 5 of the I-beam supports are adapted to receive any vertical shocks which may be imparted to the guard rail structure. In case of destructive deformation the relative strength of the parts is such that first element to undergo failure or permanent deformation will be the web 5. Accordingly, when it is necessary to repair or replace the guard rail after sustaining destructive shocks, it will be found that the mere replacement or bending back into shape of the I-beam support 5 is sufficient.

In order to facilitate erection of the rail guard, bolt holes 19 are drilled on one end of the bar plate 4, having a substantially larger diameter than that of the securing bolts 8. By means of such an expedient it is possible that inaccuracy in driving of the supporting posts and varying road grades may be compensated for.

The present type of rail guard construction or equivalents thereof may also be adapted for bridge and steel roadway installations. The particular type of metallic beam assembly renders my form of construction especially suitable for erection in combination with metallic bridge or highway structures.

By making the supporting posts 3 in the form of steel H-columns, it is possible to drive them into the ground with a portable pile driver, thus obviating the delay and added disadvantages attributable to the necessity of digging post holes.

Although I have described my rail guard construction as being composed entirely of steel or metallic members, it is understood that I do not limit it to such materials alone. It may be found desirable in particular circumstances and in certain structural requirements to utilize non-metallic materials such as wood or reinforced concrete in some of the elements composing the combination of my device. I therefore intend to claim the equivalent materials of construction so long as the spirit of my invention is not violated.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a highway guard rail fabricated from standard structural steel forms, the combination of a plurality of H-beam supporting posts, rail-carrying members secured to said posts, said members being in the form of I-beam sections, and rail members in the form of flat plates carried by said I-beam members, the ends of said rail members overlapping each other on adjacent posts.

2. In a highway guard rail fabricated from standard structural steel forms, the combination of a plurality of H-beam supporting posts, rail-carrying members secured to said posts, said members being in the form of I-beam sections, and rail members in the form of flat plates carried by said I-beam members, the ends of said rail members overlapping each other on adjacent posts, and holes in the ends of said rail members adapted to receive suitable fastening means, the holes in one end of each rail member being of substantially larger diameter than those in the other end.

3. In a highway guard rail fabricated from structural steel forms and plates, the combination of a plurality of structural steel beam-supporting posts, rail-carrying members secured to said posts, said members being in the form of structural steel beam sections, and rail members in the form of plates carried by said rail-carrying members, the ends of said rail members overlapping each other at adjacent posts.

4. In a highway guard rail fabricated from structural steel forms and plates, the combination of a plurality of structural steel beam-supporting posts, rail-carrying members secured to said posts, said members being in the form of structural steel beam sections, and rail members in the form of plates carried by said rail-carrying members, the ends of said rail members overlapping each other at adjacent posts and holes in the ends of said rail members adapted to receive suitable fastening means, the holes in one end of each rail member being of substantially larger size than those in the other end.

5. In a highway guard rail, the combination of a series of supporting posts, a plurality of relatively flexible metal plates carried in spaced relationship from said posts, and means for supporting said flexible plates on said posts comprising a single plate of relatively ductile non-resilient metal spanning the space between said rail members and said supporting posts.

6. In a highway guard rail, the combination of a series of supporting posts, a plurality of flexible plates carried in spaced relationship from said posts, and means for supporting said flexible plates on said posts comprising a horizontally disposed single plate of relatively ductile non-resilient metal spanning the space between said flexible plates and said supporting posts.

7. In a highway guard rail, the combination of a series of supporting posts, a plurality of flexible plates carried in spaced relationship from said posts, means for supporting said flexible plates on said posts comprising a single plate of relatively ductile non-resilient metal spanning the space between said flexible plates and said supporting posts, and means for securing the ends of said plates and adapted to impart frictional resistance against the longitudinal movement of said plates.

8. In a highway guard rail, the combination of a series of supporting posts, a plurality of flexible plates carried in spaced relationship from said posts, means for supporting said flexible plates on said posts comprising a single plate of relatively ductile non-resilient metal spanning the space between said flexible plates and said supporting posts, and fastening means securing the ends of said plates in surface to surface contact adapted to impart frictional resistance against the longitudinal movement of said plates.

9. In a highway guard rail, the combination of a series of supporting posts, a plurality of flexible plates carried in spaced relationship from said posts, means for supporting said flexible plates on said posts comprising a single plate of relatively ductile non-resilient metal spanning the space between said flexible plates and said supporting posts, openings in the ends of said plates, fastening means extending through said openings, the latter being of larger size than said fastening means whereby the ends of said plates are secured together in surface to surface contact adapted to impart frictional resistance against the longitudinal movement of said plates.

LEE H. MILLER.