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GUARD RAIL STRUCTURES FOR HIGHWAYS

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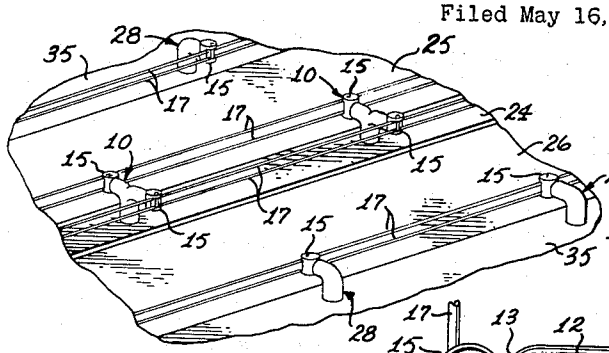


FIG. 1

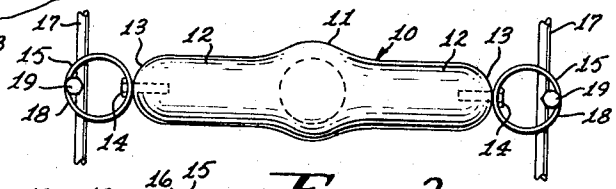


FIG. 2

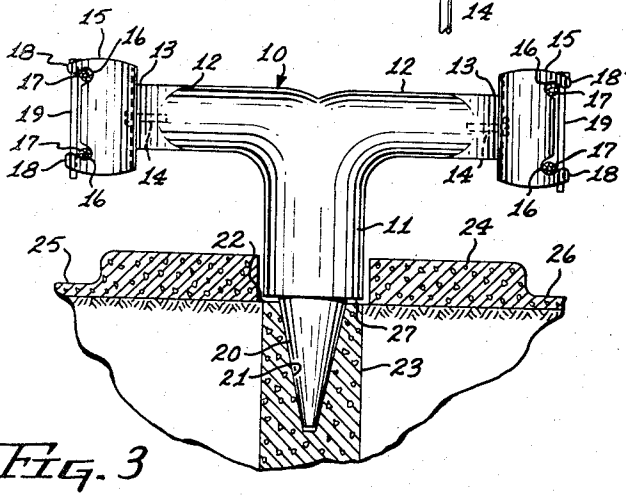


FIG. 3

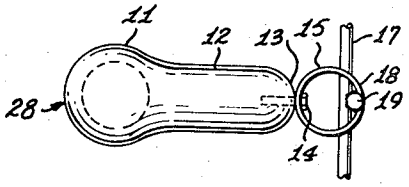


FIG. 4

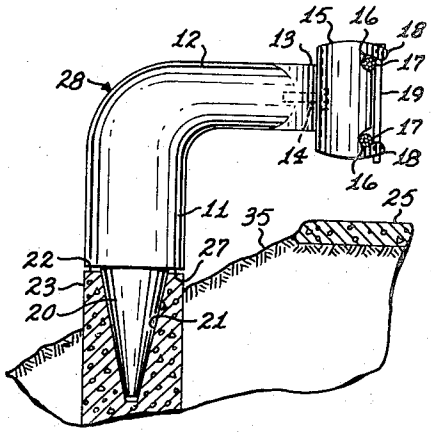


FIG. 5

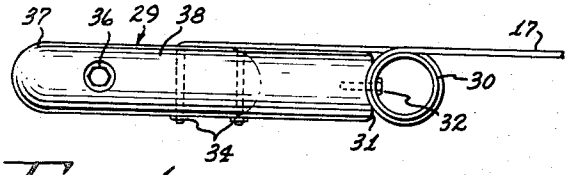


FIG. 6

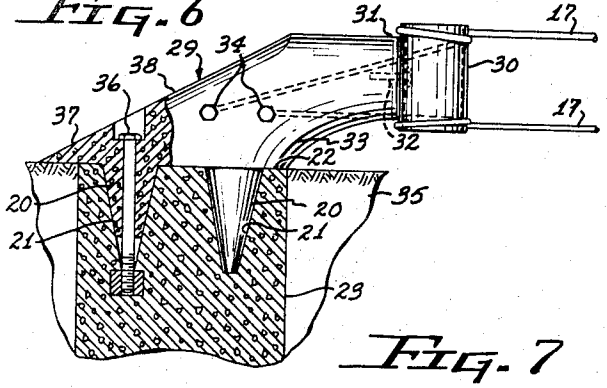


FIG. 7

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GUARD RAIL STRUCTURES FOR HIGHWAYS

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ABSTRACT OF THE DISCLOSURE

A guard rail structure for highways having frictionally restrained rotating posts with radially laterally extending rail supporting portions to yieldingly restrain and decelerate a motor vehicle striking the guard rail.

This invention pertains to fence structures and is particularly directed to improvements in guard rail structures for highways.

Background of the invention

(1) The field of this invention lies in protective structures for highways and more particularly is directed to a guard rail structure extending along the side of a street or highway.

(2) Heretofore highway structures have failed to provide adequate protection for the occupants of a vehicle which collided with the guard rail structure. Further, little or no consideration has been given to the problem of speed and ease of replacing a damaged guard rail after being struck by a motor vehicle. No consideration has been given to a really effective guard rail structure to cushion the blow of engagement of the vehicle with the guard rail structure so as to gradually reduce the speed of the vehicle and thereby protect the occupants of the colliding vehicle at the time of impact with the rail.

Summary of the invention

One of the objects of this invention is to provide a guard rail structure for highways which may be quickly and easily set up and which may be removed for repairs or access to the road areas with a minimum of effort and skill being required in the manipulation of the guard rail structure.

Still another object of this invention is to provide a guard rail structure that is highly versatile in going around curves and up and down hills and which maintains a strong cable structure for arresting a car's motion.

Still another object of this invention is to provide a guard rail structure for a highway which may be initially positioned in a precast foundation in a rapid, accurate and efficient manner.

Still another object of this invention is to provide a guard rail structure utilizing tapered shank and socket connections with the foundation along the highway so as to provide easy setup and removal of broken portions of the fence during bad accidents and to thereby get the guard rail structure back in operative condition in shortest possible time and with a minimum of effort.

Still another object of this invention is to provide a minimum amount of foundation and post digging requirements in setting up the unique guard rail structure.

Still another object of this invention is to provide a turning or yielding movement of the post structures in case an automobile or vehicle strikes the guard rail in an accident without significant damage and while at the same time providing a gradual or reduced suddenness of slow down of the vehicle when striking the guard rail to prevent excessive damage or accident to the driver and occupants of the vehicle.

Still another object of this invention is to provide a T-shaped median guard rail structure for a highway including

a car light divider arrangement to prevent glare from oncoming headlights in the other lanes.

Further features and advantages of this invention will appear from a detailed description of the drawings in which:

FIG. 1 is a perspective view showing a section of highway incorporating guard rails having the features of this invention.

FIG. 2 is a plan view of one of the guard rail posts.

FIG. 3 is a side elevation of one of the guard rail posts shown in FIG. 2, showing the median post and car light divider structure.

FIG. 4 is a plan view of the side of the road berm guard post.

FIG. 5 is a side elevation of the side berm guard rail post of FIG. 4.

FIG. 6 is a plan view of an end guard rail anchor on cable tie utilized with the guard rail structures of this invention.

FIG. 7 is a side elevation of the guard rail anchor shown in FIG. 6.

This invention is related to structures such as shown in Patent 3,193,255 patented July 6, 1965.

As an example of one embodiment of this invention, there is shown a highway guard rail structure for the median of a divided lane highway comprising in combination the T-shaped support posts **10** preferably formed of concrete, each comprising the vertical trunk portion **11** and the integral upwardly and outwardly extending lateral horizontal support portions **12** in the outer end **13** of which are secured suitable bolts **14** to which are fixed the cylindrical guide and support sleeves **15** having horizontally extending notches **16** to receive the guard rail cables **17**. Suitable lugs **18** receive a pin or bolt **19** to loosely secure the cables **17** in sliding contact in the notches **16**.

Formed integral with and depending downwardly from the trunk portion **11** are the conically tapered positioning and supporting shanks **20** which is adapted to be received in the mating conical bore **21** in the top end **22** of the foundation members **23** which are set at longitudinally spaced intervals in the ground of the median **24** dividing the roadways **25** and **26**, either by setting the foundation member directly in the ground or by grouting in concrete in pre-dug holes in the ground.

It is important to note, FIGS. 3 and 5, that when the post **10** is placed with its shank **20** in the conical bore **21** of the foundation member **23**, that the bottom end **27** trunk portion **11** does not bottom in the bore **21**. Also, the tapers of the shank **20** and the bore **21** are so arranged that when fully engaged the bottom end **27** of the trunk portion **11** and the top end **22** of the foundation member **23** just contact or preferably have slight clearance between surfaces **22–27** so that the shank **20** is the sole means for supporting and aligning the fence structure.

Because of the frictional interengagement between the conical surfaces of the tapered shank **20** and the bore **21** the T-shaped support posts may be swiveled against frictional restraint so as to cause a takeup in a gradual manner when struck by a moving vehicle to greatly reduce damage and serious injury. Further, the hollow cylindrical guide and support sleeve **15** will bend and crush upon impact to further decelerate more softly the vehicle impact. The demountability of the support posts greatly reduces the time and trouble in restoring the guard rail structure after a collision.

In FIGS. 1, 4 and 5 are shown L-shaped side berm support posts constructed and functioning the same as in the T-shaped units just described.

In FIGS. 6 and 7 the end guard rail cable anchors **29** are shown constructed similar to the side berm support

posts **28** having a cylindrical cable support and shock absorber **30** fixed to the outer end **31** of the anchor **29** by a suitable anchor bolt **32**, the ends of the cables **17** being wrapped around and secured to the shock absorber cylinder **30** and tied to cable anchor piers **34**.

Formed integral with and depending downwardly from the trunk portion **33** are a pair of conically tapered positioning and supporting shanks **20** which are adapted to be secured in mating conical bores **21** in the top end **22** of the foundation member **23** which are set in the side berm **35** of the roadway **25** or **26**. An anchor bolt **36** may preferably lock the rear portion **37** securely to the foundation member **23**. The guard rail anchor **29** has an upwardly forwardly sloping surface **38** so as to eliminate a dead head-on collision with the cable anchor at culvert, bridge and pier along the roadway, the slope of the surface **38** being such as to guide the vehicle up and over and away from the object ahead.

While the apparatus herein disclosed and described constitutes a preferred form of the invention, it is also to be understood that the apparatus is capable of mechanical alteration without departing from the spirit of the invention and that such mechanical arrangement and commercial adaptation as fall within the scope of the appendent claims are intended to be included herein.

Having thus fully set forth and described this invention what is claimed and desired to be obtained by United States Letters patent is:

We claim:

1. A guard rail structure for highways comprising in combination:

(A) a plurality of rotatable support posts swivable about vertical axes arranged in longitudinally radially spaced positions along the side of a highway each having,

(B) a trunk portion having an integral horizontal laterally radially extending support portion,

(C) means on the outer ends of said support portion for securing a guard rail above and along the side of the highway,

(D) vertically disposed conically tapered positioning and supporting shanks formed integral with and depending convergingly downwardly from the bottom end of each of said trunk portions of said support posts,

(E) and a foundation member, one for each support post, having a mating vertically disposed conical bore extending convergingly downwardly adapted to rotatably and frictionally, demountably receive said tapered shank of a support post to provide the sole means for positioning, aligning, and yieldingly frictionally rotatably restraining the guard rail structure in operative position along the side of the highway.

2. In a guard rail structure as set forth in claim **1** wherein said means on the outer ends of said support portions vertically slidingly supports the guard rail elements with freedom of horizontal longitudinal movement relative to said support posts.

3. In a guard rail structure as set forth in claim **1** wherein rigid guard rail anchors are provided having a plurality of integral conically tapered positioning and supporting shanks adapted to be received in mating conical bores in a foundation member and including an anchor bolt for positively securing said tapered shanks against rotation to said foundation member.

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