June 29, 1937. H. A. WOOD 2,085,058

GUARDRAIL

Filed March 12, 1934

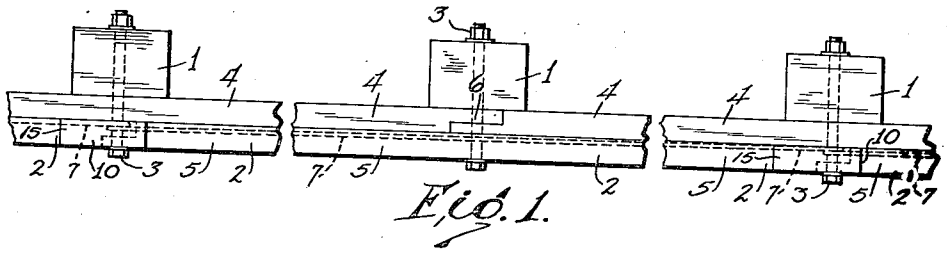

FIG. 1.

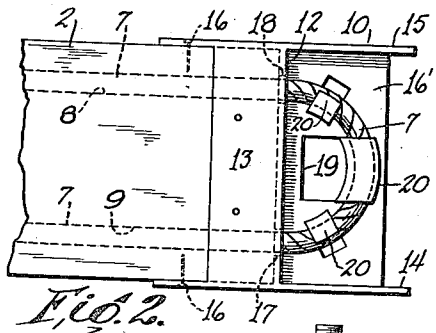

FIG. 2.

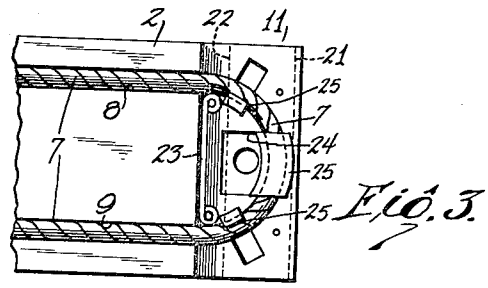

FIG. 3.

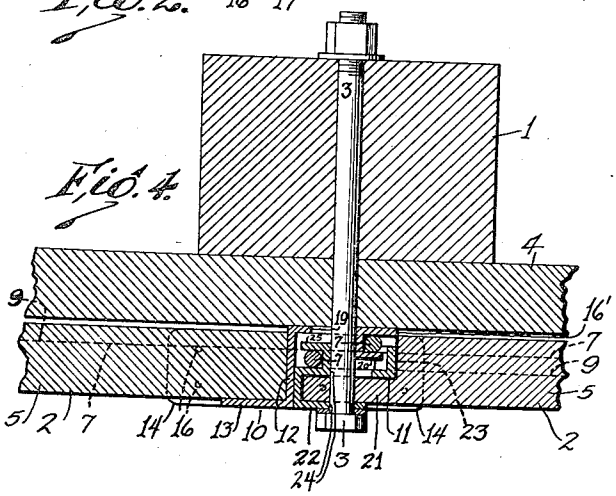

FIG. 4.

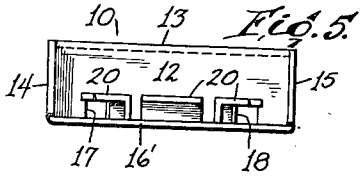

FIG. 5.

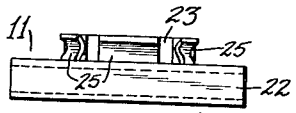

FIG. 6.

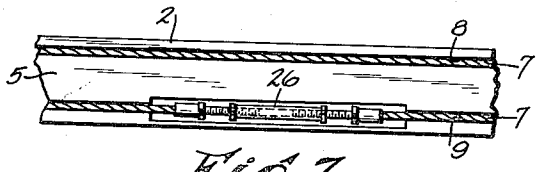

FIG. 7.

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GUARDRAIL

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8 Claims. (Cl. 256—13.1)

The present invention relates to improvements in guard rails and guard fences, such as are used along the highways for preventing vehicles from leaving the highways and from turning over the embankments thereof.

Guard rails of this character have been constructed of various structural materials such as wood, cables, stones, concrete and woven wire, and it is the object of the present invention to provide a guard rail of improved construction that combines particularly the advantages of the wooden rail with those of the cable.

The wooden rail has the advantage of comparative cheapness in construction where ample wood is available, and of high visibility, but has the disadvantage of breaking under heavy loads. The cable has the advantage of resisting heavy loads or impacts, but suffers from the defect of low visibility.

In the present invention it is proposed to combine wood and cable to produce a rail that has the advantages of both, and at the same time avoids the disadvantages and undesirable features of both taken individually.

Further objects and advantages of my invention will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawing, in which

Figure 1 shows in top plan view a guard fence constructed in accordance with my invention, portions of the rail being broken away;

Figure 2 shows a front view of an end portion of a rail used in my fence;

Figure 3 a rear view of an end portion of an adjacent rail adapted to be assembled therewith by means of a bolt anchored in a fence post;

Figure 4 a horizontal section through a portion of the fence at a post;

Figure 5 an end view of a metallic end piece for a rail;

Figure 6 an end view of a metallic end piece used in conjunction with that shown in Figure 5; and

Figure 7 a fragmentary detail view of an intermediate portion of a rail.

While I have shown only the preferred form of my invention I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

In its preferred form my fence comprises a plurality of posts 1 arranged in suitably spaced relation and the rail 2 anchored to the posts by means of bolts 3. The rail is made of wood and is preferably of the laminated type, two laminations 4 and 5 being provided, the laminations 4 being of conventional construction and being disposed next to the posts and arranged to overlap at the joints as shown at 6. The laminations are preferably of sufficient length to cover the spacing between several posts so that joints are only necessary at each second or third post as may be desired. The outside laminations 5 are of particular construction and have cables 7 associated therewith for reinforcing the same. To accommodate the cables which are made in the form of continuous loops, each lamination is provided with two grooves 8 and 9 in the inner face thereof, the grooves being parallel and being relatively near the upper and lower edges of the laminations. Each length of the lamination is formed with two metallic end pieces 10 and 11 shown in detail in Figures 5 and 6 respectively.

The end piece 10 comprises a plate 12 adapted to lie against the end of the wood lamination and has an outer flange 13 lying against the outer face of the wood and two end flanges 14 and 15 lying against the upper and lower edges of the wood, and these flanges may be secured to the wood by means of nails passing through holes 16. The flanges 14 and 15 project beyond the end of the wooden lamination and are interconnected by a flange 16' being substantially in alignment with the inner face of the wood. The plate 12 is formed with apertures 17 and 18 arranged in alignment with the grooves 9 and 8, so as to allow the two strands of the looped cable to pass therethrough, and the outwardly projecting flange 16' is formed with a central opening 19 for receiving the bolt 3, and has a plurality of struck-up portions 20 serving as guides for the looped end of the cable whereby the latter is guided in a substantially semi-circular curve around the opening 19. The struck-up portions 20 are dimensioned transversely so as to occupy no more than approximately one-quarter of the thickness of the lamination as appears from Figure 4.

The second end piece 11 which is illustrated in detail in Figures 3 and 6 is made to fit the opposite end of each lamination, which latter for this purpose is reduced in thickness so as to provide a projecting tongue 21, see Figure 4. The end piece comprises a U-shaped member 22 fitting over the tongue 21 so as to form a cap for the same, and the inner leg of the U-shaped member is provided with a projecting flange 23 lying against the end of the reduced portion of the

lamination. The tongue and the U-shaped member are dimensioned transversely of the wood so as to occupy substantially one-half of the thickness thereof, as shown in Figure 4. The flange 23 is foreshortened so as to allow the cable 7 to pass the outer ends thereof as shown in Figure 3, and the two legs of the U-shaped member 22 are formed with bolt holes 24 adapted to be aligned with the bolt holes 19 for allowing the bolt 3 to pass therethrough. The inner leg of the U-shaped member is also provided with struck-up portions 25 for guiding the looped cable 7 in semi-circular form around the bolt hole 24.

It will be seen that in this manner a continuous loop of cable is imbedded in the inner face of the outer lamination 5, the ends of the cable loop being anchored in the two end pieces of each lamination in the manner described. The ends of the cable may be suitably secured together to form a loop by means of a turn buckle 26 or any equivalent arrangement.

Each length of lamination forms a complete unit in itself, and is provided with the two end pieces and has the cable imbedded in the grooves and anchored in the end pieces so that it may be secured and removed as a unit. In assembling the inner laminations 4 are first applied and temporarily held to the posts in aligned relation. Next the outer laminations are applied with the grooves on the inside, the end pieces 11 fitting into the outer portions of the end pieces 10 so that the cables are arranged in overlying relation, the two ends of the two loops passing around the bolt holes 19 and 24 respectively. The joints of the outer laminations are preferably staggered with the joints of the inner laminations as shown in Figure 1. One bolt 3 holds both of the end pieces of two adjacent laminations in place by passing through the registering bolt holes 19 and 24, and the bolt thereby firmly interlocks the two loops 7 of two adjacent pieces whereby all the cables of all the pieces are interlocked throughout the length of the fence.

If a motor vehicle should hit the fence, say at right angles, with sufficient force to break the wood, the cable will prevent the automobile from going through the fence and the force of the motor vehicle will be opposed not only by the particular stretch of rail between two posts but by the entire fence since all the cables are interlocked with one another. Thus the shock is distributed over the entire fence. In case a repair becomes necessary to an individual unit of the fence, the unit may be readily removed and a new unit substituted therefor without disturbing the remainder of the fence.

It will be noted that this construction offers all the advantages of a wooden rail as far as visibility is concerned and also the deflecting power of the fence. Any motor vehicle hitting the fence a glancing blow will merely be deflected back upon the highway. On the other hand, the fence has all the advantages of a cable fence, and thus combines the desirable qualities of the cable with those of the wood.

I claim:

1. A guard fence comprising a plurality of posts, wooden guard rails disposed along the posts in aligned relation, bolts for anchoring the rails to the posts, and looped cables reinforcing the rails and having their ends passing around the bolts so as to be interlocked thereby.

2. A guard fence comprising a plurality of posts, wooden guard rails having metallic end pieces and being disposed along the posts in aligned relation with the metallic end pieces overlapping at the posts, bolts for anchoring the end pieces to the posts, and looped cables reinforcing the rails, the cables being anchored in the end pieces on opposite sides of the bolts so as to be interlocked thereby.

3. A wooden guard rail having metallic end pieces and bolt holes in the end pieces whereby they may be anchored to supporting elements and looped cables for reinforcing the guard rail, the end pieces having projections arranged to guide the ends of the looped cable around the bolt holes.

4. A guard fence comprising a plurality of posts, wooden guard rails arranged along the same in aligned relation, means for anchoring the rails to the posts and looped cables for reinforcing the guard rails, the cables being interlocked by the anchoring means.

5. A guard fence for highways comprising posts, laminated guard rails, means for securing the rails to the posts, and cables disposed between the laminations and being looped around said means for providing a continuous cable support throughout the length of the fence in addition to the rail support.

6. A guard fence for highways comprising posts, laminated guard rails, bolts for securing the rails to the posts, and looped cables disposed between the laminations and being looped around the bolts for providing a continuous cable support throughout the length of the fence in addition to the rail support.

7. A safety fence for highways comprising a plurality of wooden posts disposed at the edge of the highway, wooden guard rails arranged on the insides of the posts, looped cables mounted between the posts and the surfaces of the guard rails facing the highway, said cables overlapping at their ends that are disposed at the joints between the guard rail sections and the posts, and means securing both the guard rails and the overlapped portions of the looped cable ends to the posts.

8. The combination with a highway safety fence comprising posts and wooden guard rails secured to the posts, of cables disposed between the posts and the surfaces of the guard rails facing the highway, said cables being sufficiently yieldable to permit the wooden rails to act as a cushion and absorb a portion of the shock, and means securing the cables at intervals to the rails and posts so that the cables also serve to reinforce the rails.

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