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E. S. HIPPEY.
GUARD RAIL STRUCTURE.
APPLICATION FILED JUNE 28, 1906.

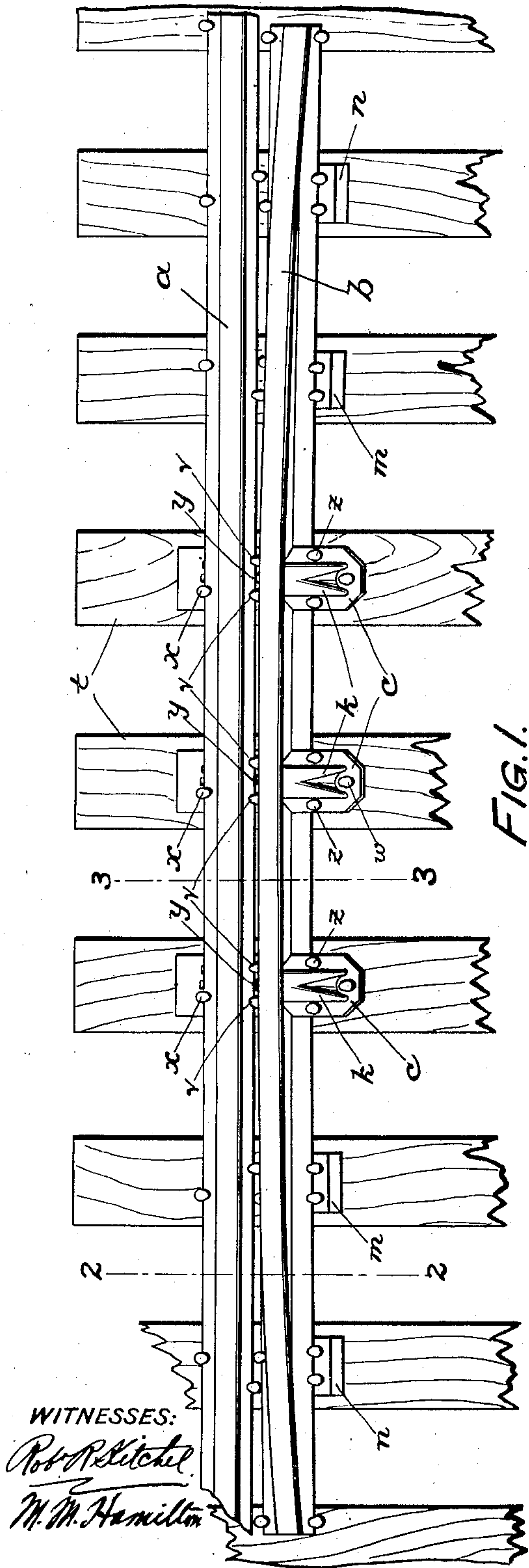


FIG. 1.

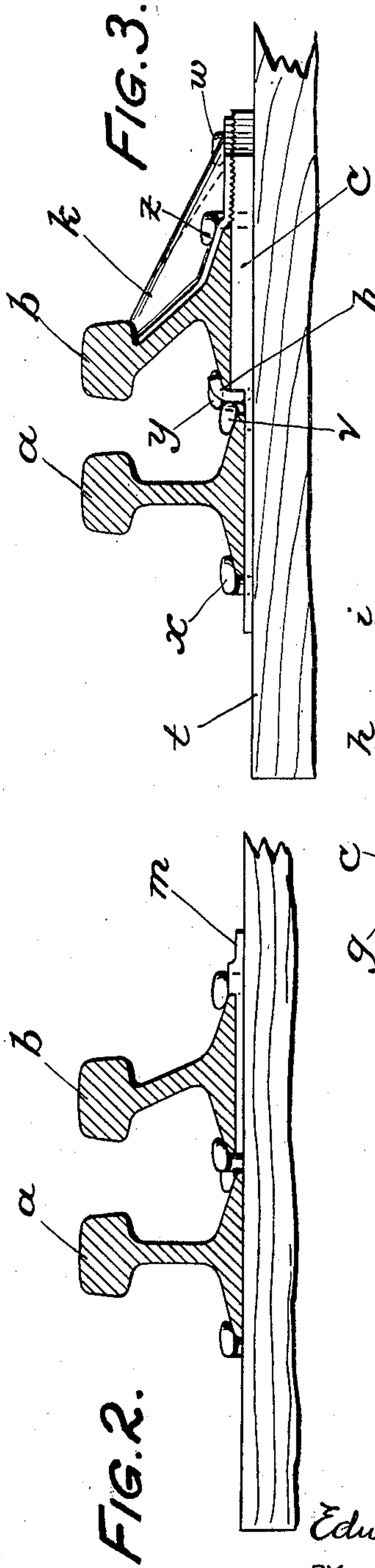


FIG. 2.

FIG. 3.

FIG. 4.

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GUARD-RAIL STRUCTURE.

No. 836,881.

Specification of Letters Patent.

Patented Nov. 27, 1906.

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To all whom it may concern:

Be it known that I, EDWIN S. HIPPEY, a citizen of the United States, residing at York, county of York, and State of Pennsylvania, have invented a new and useful Improvement in Guard-Rail Structures, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to produce a guard-rail and fastener therefor that will be strong and durable, relatively cheap to construct and maintain, and adjustable to take up wear.

In the drawings, Figure 1 is a plan view of the guard-rail structure. Fig. 2 is an enlarged cross-section on the line 2 2 of Fig. 1. Fig. 3 is an enlarged cross-section on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the tie-plate.

a is the main rail, and *b* the guard-rail. Unlike the ordinary guard-rail, the rail *b* is not rolled to a special form; nor does it consist of a rail of ordinary section with a portion of its base-flange cut away to allow it to be brought close to the main rail. The rail *b*, on the contrary, is a rail rolled to ordinary section and having the following characteristics: First, the head and web are displaced with relation to its base laterally toward the main rail, the point of greatest displacement being at the central portion of the rail—say for a distance of three feet—the extent of displacement gradually decreasing from such central portion toward each end; second, the base itself may be perfectly straight, but preferably is bent or curved to a slight extent, the extent of curvature being sufficient to bring the base at the central portion of the guard-rail within a comparatively short distance of the base of the main rail; third, at any given point in the length of the rail (except at the ends, where there is no displacement) the extent of displacement increases gradually from the base to the head—that is, the head is displaced to a greater extent than the web and the upper part of the web is displaced to a greater extent than the lower part of the web, the head thus overhanging one of the base-flanges and being connected with the base by a web more or less inclined to the vertical. There is thus formed a guard whose head is bent or curved to about the same extent as the ordinary guard-rail as a whole, while the base of the rail is bent or

curved but slightly or not at all and the connecting-web is inclined except at its ends, with an angle of inclination increasing gradually from each end portion toward the central portion of the rail.

The guard-rail may be of the same size as the main rail. In the accompanying drawings it is so shown, although the guard-rail, while of corresponding cross-section, may be of larger size than the main rail, or it may be of smaller size, although this latter would be undesirable.

The construction of the fastening devices is slightly-modified, dependent upon the relative sizes of the main rail and guard-rail, as will hereinafter be explained.

At the central portion of the guard-rail the main rail and guard-rail are supported on tie-plates.

Inasmuch as the web in the displacing operation has been inclined as described, the rail has been shortened in height and is therefore of less height than the guard-rail. To bring the head of the guard-rail onto a level with the head of the main rail, the part of the plate *c* on which the guard-rail rests is above the level of the part of the plate on which the main rail rests. This may be accomplished in several ways, as by making the plate *c* thicker in the part thereof that supports the guard-rail.

The plate *c* at the end projecting outside the main rail is provided with three or more spike-holes *d*, *e*, and *f*, located at different distances from the end of the plate, and through, one of which a spike *x* is driven to secure the outer foot-flange of the main rail and the corresponding end of the plate to the tie *t*. The plate is also provided near its longitudinal center with the slot *g*, through which a spike *y* is driven to secure the inner foot-flange of the guard-rail to the tie. On each side of the slot *g* is a lug *h*, which is preferably integral with the tie-plate, being struck up therefrom as shown. This lug engages the inner foot-flange of the guard-rail and holds the guard-rail from being displaced upwardly and outwardly by blows or strains upon the inner side of its head. The holes made in the plate *c* to form the lug *h* are utilized to drive spike *v* through to hold the inner foot-flange of the main rail to the tie. The plate is also provided in the part just beyond the outer foot-flange of the guard-rail with spike-holes *i*. *k* is a brace engaging the underside of the outer part of the head of the guard-rail and

the end of the tie-plate beyond the guard-rail. The abutting faces of the brace and tie-plate are serrated or corrugated, as shown, to hold the brace from slipping outwardly. The corrugated part of the plate near its outer end is provided with a spike-hole *j*. The brace is also provided with spike-holes alining with the holes *i* and *j* in the plate. Through the holes *i*, *i*, and *j* in the plate and the holes in the brace corresponding thereto are driven the spikes *z z* and *w*, respectively, whereby the brace and tie are secured together and both secured to the tie. The spikes *z z* also hold in place the outer foot-flange of the guard-rail.

To place the guard-rail in position, the main rail is lifted and the tie-plate inserted thereunder. The guard-rail is then placed upon the plate and moved toward the main rail until it abuts against the lugs *h*. The main rail is then fastened down by spike *x*, driven through the hole *d*, and spike *v* driven through the holes formed by striking up the lug *h*, the hole *d* being just outside the outer foot-flange of the main rail. The brace is then applied and spike *y* driven through the hole *g* in the plate and spikes *z* and *w* driven through the holes *i* and *j* in the plate and the corresponding holes in the brace.

When the inner side of the head of the guard-rail wears away, all the spikes except the spikes *v* are withdrawn, the spike-holes in the ties filled, and the tie-plate, with the guard-rail thereon, moved together to bring the main head of the guard-rail closer to the main rail and to bring the hole *e* just outside the outer foot-flange of the main rail. The spikes are then redriven as before, except that the spike *x* is driven through the hole *e* instead of the hole *d*. As many different adjustments are thus provided for as there are holes *d e f* in the tie-plate.

It will be understood that *d*, *e*, and *f* need not be separate holes so long as means are provided to permit the main rail to be spiked down in different positions of the tie-plate.

It will be understood that if the guard-rail is a larger-sized rail than the main rail the guard-rail when its head is displaced outwardly may be reduced in height to that of the main rail, in which event the tie-plate may be of the same thickness throughout.

It will also be understood that the ties that receive the tie-plate must either be sunk below the level of the other ties or must be recessed to the depth of the thickness of the plate, so as to preserve the level of the main rail.

To the extent that the displacement of the head and web laterally decreases the height of the rail increases, so that provision must be made for maintaining the level of the head of the guard-rail through its length.

In the drawings I have shown three tie-plates *c*, all precisely alike in structure and

proportion, underlying the central part of the guard-rail, throughout which the lateral displacement of the head and web is uniform, and I have also shown under that part of the rail along which the displacement progressively varies a series of plates *m n* of progressively-varying thickness, which need underlie only the guard-rail. The plate *m* should be thinner than the difference between the thickness of the two parts of the tie-plate *c*, while the plate *n* should be thinner than the plate *m*. It will be understood, however, that the invention is independent of the precise number of the plates *c* and plates *m* and *n*.

It will be understood that the improved guard-rail described need not be secured in position by means of the particular fastening device described, and it will also be understood that the fastening device described is capable of application to the ordinary types of guard-rails, although the fastening device described is particularly adapted for use in connection with the improved guard-rail; nor is it essential that the cross-sections of the two rails should correspond, although this is preferable, as the utilization of the ordinary T-rail, without cutting away the base, is one of the objects of the invention.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The combination with the main rail, of a guard-rail of a cross-section corresponding to the main rail but having its head and web displaced laterally toward the main rail, the extent of said lateral displacement varying along the length of the guard-rail, and means securing the rails in proper relation.

2. The combination with the main rail, of a guard-rail having its head and web displaced laterally toward the main rail, said displacement diminishing from its central portion toward its ends, and means securing the rails in proper relation.

3. The combination with the main rail, of a guard-rail bent or curved with relation to the main rail, the extent of curvature of the head of said guard-rail substantially exceeding the extent of curvature of the base thereof, and means securing the rails in proper relation.

4. The combination with the main rail, of a guard-rail having a head substantially curved with relation to the main rail and a base substantially parallel to the main rail, and means securing the rails in proper relation.

5. The combination with the main rail, of a guard-rail whose web, between its ends, is inclined with respect to the web of the main rail, the angle of inclination of said web increasing from the end portions toward the central portions, and means securing the rails in proper relation.

6. The combination with a guard-rail hav-

ing foot-flanges, a head, and a connecting-web extending substantially vertically at points in the length of the rail and extending at an-angle to the vertical at other points in the length of the rail, of the main rail, and means securing the rails in proper relation.

7. The combination with a guard-rail having a head and base, each of unvarying cross-section, said head overlying one flange only of the base at points in the length of the rail, and overlying both flanges of the base at other points in the length of the rail, of the main rail, and means securing the rails in proper relation.

8. The combination with the main rail, of a guard-rail whose web is inclined toward the main rail, the angle of said inclination being greatest at the central portion of the guard-rail and diminishing toward its ends, one or more tie-plates underlying both rails, and plates of lesser height underlying the guard-rail beyond the tie-plates.

9. The combination with the main rail, of a guard-rail whose web is inclined toward the main rail, the angle of said inclination being greatest at the central portion of the guard-rail and diminishing toward its ends, one or more tie-plates underlying both rails, and two or more plates of lesser height on each side of the tie-plates, said plates progressively diminishing in height toward the ends of the guard-rail.

10. The combination with the main rail, of the guard-rail, a cross-tie, a tie-plate underlying both rails, a lug on the tie-plate engaging the inner foot-flange of the guard-rail, there being holes in the plate receiving spikes engaging respectively the inner foot-flange of the guard-rail and the inner foot-flange of the main rail, and means enabling a spike to extend through the tie-plate and engage the outer foot-flange of the main rail at different transverse positions of said guard-rail and tie-plate.

11. The combination with the main rail, of the guard-rail, a cross-tie, a tie-plate underlying both rails, a lug on the tie-plate engaging the inner foot-flange of the guard-rail, said lug being struck up from the tie-plate to form spike-receiving holes adjacent to the inner foot-flange of the main rail, and means enabling a spike to extend through the tie-

plate and engage the outer foot-flange of the main rail at different transverse positions of said guard-rail and tie-plate.

12. The combination with the main rail, of the guard-rail, a cross-tie, a tie-plate underlying both rails, a lug on the tie-plate engaging the inner foot-flange of the guard-rail, a brace underlying the outer part of the head of the guard-rail and abutting against the top of the tie-plate outside the guard-rail, the abutting surfaces of the tie-plate and brace being serrated, and spikes securing the rails and tie-plate to the cross-tie.

13. The combination with the main rail, of the guard-rail, a cross-tie, a tie-plate underlying both rails, a lug on the tie-plate engaging the inner foot-flange of the guard-rail, a brace underlying the outer part of the head of the guard-rail and abutting against the top of the tie-plate outside the guard-rail, the abutting surfaces of the tie-plate and brace being serrated, and means enabling the tie-plate and rails to be secured to the cross-tie at different points of transverse adjustment of the guard-rail and tie-plate with respect to the main rail.

14. The combination with the main rail, of the guard-rail, a cross-tie, a tie-plate underlying both rails, a lug on the tie-plate engaging the inner foot-flange of the guard-rail, a brace underlying the outer part of the head of the guard-rail and abutting against the top of the tie-plate outside the guard-rail, the abutting surfaces of the tie-plate and brace being serrated, there being a longitudinally-extending slot in the plate receiving a spike engaging the inner foot-flange of the main rail, a hole in the plate receiving a spike engaging the outer foot-flange of the guard-rail, a hole in the plate receiving a spike engaging the brace, and a series of spike-receiving orifices in the plate near the end thereof beyond the main rail, the outer walls of said orifices being at varying distances from the edge of the plate.

In testimony of which invention I have hereunto set my hand, at York, Pennsylvania, on this 16th day of June, 1906.

EDWIN S. HIPPEY.

Witnesses:

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SMYSER WILLIAMS.