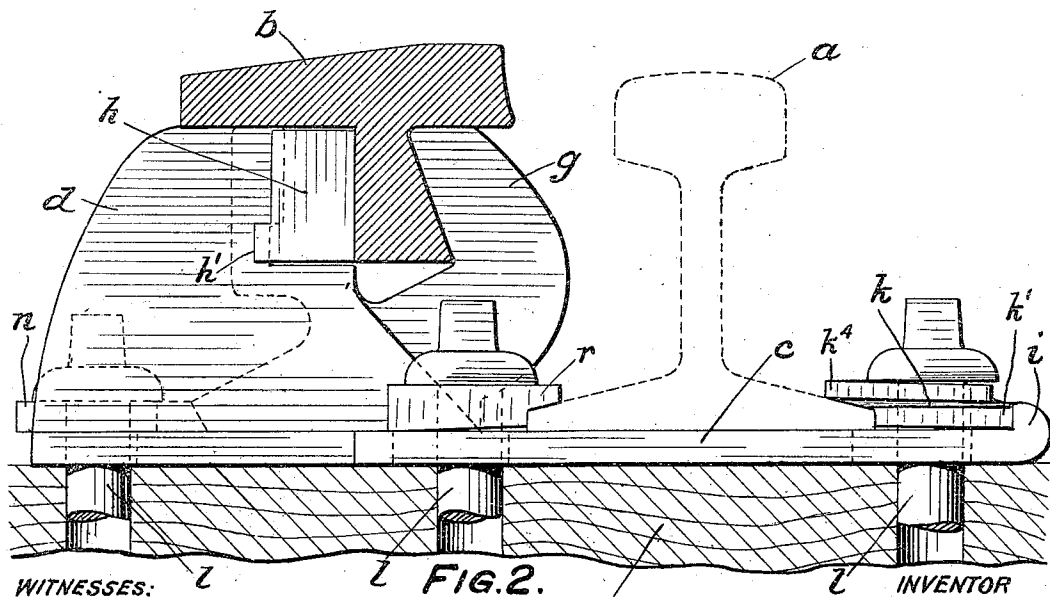
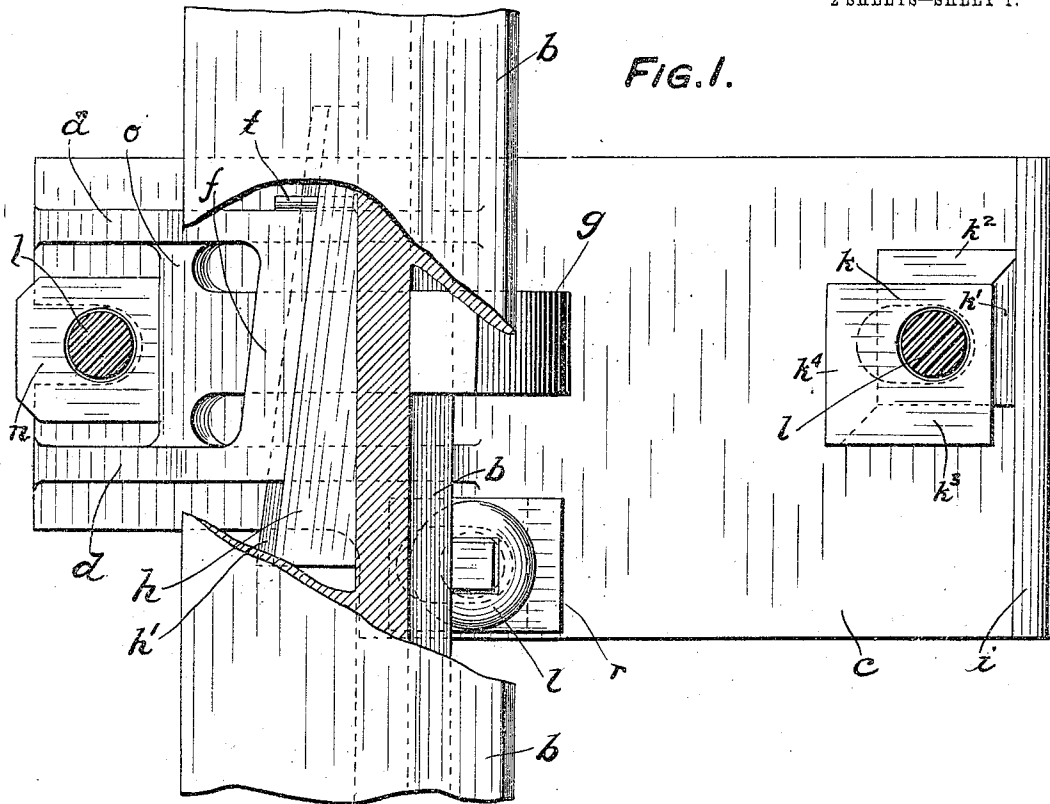


G. B. TAYLOR.
GUARD RAIL STRUCTURE.
APPLICATION FILED MAY 20, 1909.

947,316.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

Robt. Mitchell
E. E. Wall

FIG. 2.

m

George B. Taylor

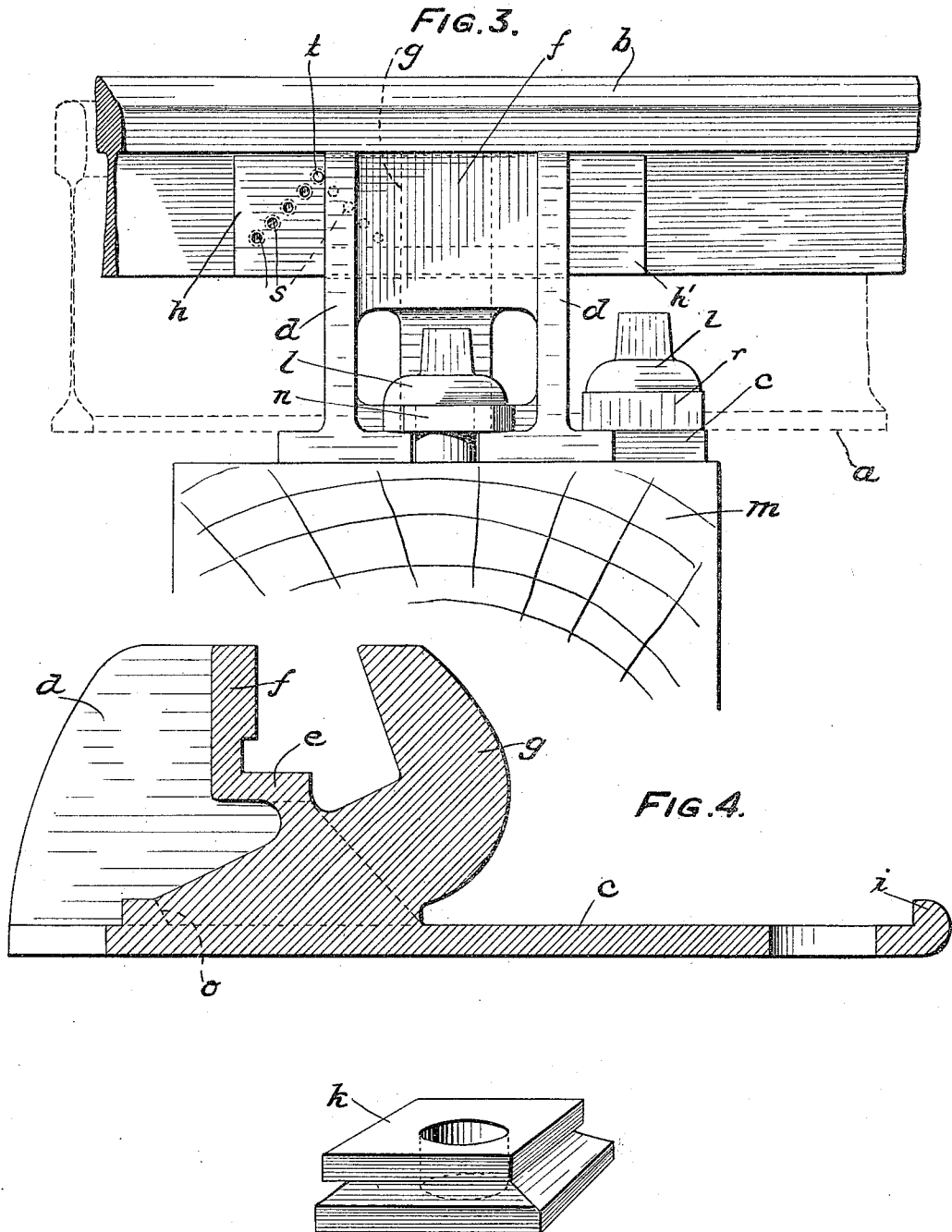
BY *Harding & Harding*
ATTORNEYS.

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2 SHEETS—SHEET 2.



WITNESSES:

Robt. R. Kitchin
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FIG. 5.

INVENTOR

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UNITED STATES PATENT OFFICE.

GEORGE B. TAYLOR, OF PHILADELPHIA, PENNSYLVANIA.

GUARD-RAIL STRUCTURE.

947,316.

Specification of Letters Patent.

Patented Jan. 25, 1910.

Application filed May 20, 1909. Serial No. 497,349.

To all whom it may concern:

Be it known that I, GEORGE B. TAYLOR, a citizen of the United States, residing at Philadelphia, county of Philadelphia, 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 provide a new guard rail and chair therefor adapted for use on railroads and especially under conditions wherein the guard rail acts not only as a safety device but also to receive the direct lateral thrust of the car wheels. Guard rails of this character are perhaps subject to the most severe usage on passenger railroads of large cities, such as subway roads and elevated roads, in which the curves are not only numerous but frequently very sharp.

The ordinary guard rail and chair, which approximately meet the requirements of ordinary long-distance steam railroads, fail utterly when applied to local transit roads, and the members of the guard structure, particularly the bolts by which the guard rail and main rail are tied together, are so frequently displaced and broken that their maintenance and replacement is a serious item of expense.

In my invention, one preferred form of which is shown in the drawings and hereinafter described, a guard rail structure is provided that is adapted to resist the strains and shocks incidental to its use under the most severe conditions and is also adapted to be adjusted from time to time to compensate for the wearing away of the head of the guard rail.

While the invention is more particularly designed for application to railroad tracks having sharp curves and over which trains travel at frequent intervals, it is also adapted for general use, not only in curves, but also at frogs, crossings and switches.

In the drawings: Figure 1 is a plan view of the structure, partly broken away; Fig. 2 is a side view of the chair, showing the guard rail in section and the main rail in dotted lines; Fig. 3 is an end view of the structure; Fig. 4 is a longitudinal section through the chair; Fig. 5 is a detail perspective view of one of the clips.

a is the main rail and *b* the guard rail.
c is the base plate of the chair.

d, d, are webs spaced apart and extending upwardly from the base *c*.

e, f are ribs connecting the webs *d, d*.

g is a jaw extending upwardly from the base *c* between the webs *d, d*.

The members *e, f*, extend at an angle to the longitudinal extension of the guard rail and main rail and, together with the inwardly and upwardly projecting member of the jaw *g*, form a pocket for the reception of the web of the guard rail and for a wedge *h* to hold the guard rail in place.

To hold the chair to the ties the following means are provided: The outer end of the base plate *c* is provided with a lip *i*, between which and the outer flange of the main rail is inserted a clip *k*, which partly overhangs said flange and is of a peculiar construction to be hereinafter described. A screw-spike *l* extends through the clip and through a slot in the base plate *c* into the tie *m*. At the inner end of the base-plate *c* a ridge *o* extends parallel to the guard rail and against which is abutted a clip *n*. Another screw-spike *l* extends through the clip *n* and through a slot in the base plate *c* into the tie *m*. A third clip *r* rests upon the base plate *c* adjacent to the inner flange of the main rail and partly overhangs said flange and is secured in position by a third screw-spike *l* extending through the clip *r* and through a slot in the base plate into the tie *m*.

The guard rail is preferably of a peculiar cross-section approximately like that shown in the drawings, its head having a flat lower face and an upper face sloping somewhat upwardly from its inner toward its outer portion so as to present a relatively thick outer portion to receive the thrust of the wheel flanges. The outer face of the guard rail head is somewhat inclined downwardly and outwardly toward the main rail and is also somewhat concaved from near its lower edge toward its upper edge. The web of the guard rail is substantially closer to the outer portion of the head than to the inner portion thereof. The inner face of the web extends vertically while its outer face is inclined downwardly and outwardly to correspond with the inclination of the inner face of the upwardly projecting member of the jaw *g* of the chair. The bottom of the guard rail web is preferably flat.

To apply the guard rail, a suitable number of chairs are first fastened in position by means of the clips and screw-bolts here-

inbefore mentioned. Then the guard rail is dropped into the chair pockets, the web of the guard rail being first inserted in the inner side of the pocket and then moved
 5 outwardly against the jaw *g*. The wedge *h* is then inserted between the guard rail web and the rib *f* of the chair and is driven in by a hammer until the guard-rail is firmly locked in its pocket. As shown, the wedge
 10 *h* has a flange *h'* that extends into a recess formed in the rib *f*, thereby preventing upward displacement of the wedge.

In the course of time the outer face of the guard rail will be worn away by the car-
 15 wheels and it will be desirable to move the same toward the main rail to compensate for the wear. The peculiar construction of the clips *k* and *n* permits the whole chair to be adjusted toward the main rail without the
 20 necessity of new bolt holes in the ties. The specific construction of these clips will now be described.

The clip *k* may be described as a square shaped member having a central bolt-receiving orifice and provided with four lateral
 25 flanges, two of which, *k'* and *k*², extend outwardly from two adjacent sides of the clip in line with one face of the clip, while the other two of which, *k*³ and *k*⁴, extend out-
 30 wardly from the other two adjacent sides of the clip in line with the opposite face of the clip. These flanges are of four different widths. For example, they may vary in
 width from three-eighths to three-fourths of
 35 an inch. The clip *k* may also be described as a clip having its bolt-receiving hole eccentrically located with respect to its extreme dimensions and cut-away along its
 40 four edges to form flanges of varying width arranged as described.

When a new guard rail is to be applied, the clip is inserted so that the narrowest
 flange *k'* abuts against the lip *i* of the base plate *c*. In the particular arrangement of
 45 flanges shown, the widest flange *k*⁴ will then overhang the main rail flange. This adjusts the chair at its farthest distance from the main rail.

The inner clip *n* is simply a square plate
 50 having an eccentrically-located bolt-receiving hole. That is, the distance from the center of the hole to the four sides of the clip varies to correspond with the variations in
 the widths of the flanges of the clip *k*. Assuming that the chair has been set at its
 55 farthest distance from the main rail as before described, the clip *n* is so placed that the side thereof nearest its bolt-receiving hole abuts against the ridge *o*.

60 The central clip *r* need not be adjustable and comprises merely a plate having a flange adapted to overhang the inner flange of the main rail.

After the head of the guard-rail is worn
 65 away and it is desired to adjust it toward

the main rail, the screw-spikes *l* are first loosened and the chair slid toward the main rail a distance (say) of one-eighth of an
 inch or more. Then the clip *k* is lifted and given a quarter turn so that its flange *k*²
 70 abuts against the lip *i* of the base-plate *c* and its flange *k*³ overhangs the main rail flange. Then the chair is pushed or driven so that the lip *i* abuts tightly against the clip
 75 *k*. The clip *n* is then lifted and given a quarter turn. The bolts are then tightened. It will be understood that notwithstanding this adjustment of the clips, the position of
 the bolt holes in the clips relatively to the tie remains unchanged, so that the bolts need
 80 not be withdrawn from the holes in the tie. When it is desired to again adjust the guard rail, the clip *k* is reversed so that its
 flange *k*³ abuts against the lip *i* of base-plate *c* and the flange *k*² overhangs the main
 85 rail flange, while the clip *n* is given another quarter turn.

In place of the clip *k*, four clips may be employed, each similar in construction to the clip *r*, but of different sizes, whereby the
 90 adjustments described may be effected by substituting one clip for another.

In the final adjustment, the clip *k* is given a quarter turn to bring its widest flange *k*⁴
 against the lip *i* of the base plate *c*, and its
 95 narrowest flange *k'* over the main rail flange, while the clip *n* is given a final quarter turn to set it to its most forward position.

In the particular design shown, it is preferred to bevel off the corners of the clip *n*
 100 most remote from its bolt-receiving orifice to permit the clip to be turned between the webs *d*, *d*, without wholly withdrawing the screw-bolts *m* from the ties.

Different expedients for holding the wedge
 105 *h* in position may be adopted. For example, a series of holes *s* may be formed near the narrower end of the wedge and flared at one end, and in the hole nearest the web
 110 *d*, after the wedge is driven in place, may be inserted a pin or rivet *t*, which may be upset in the flared mouth of the hole.

A guard rail, supported and braced substantially as hereinbefore described, is well
 115 adapted to resist the most severe lateral thrust of the car-wheels. Both the guard rail and the main rail are entirely without bolt holes and there are no parts corresponding to the ordinary tie bolts that are likely
 120 to be ruptured under lateral strain.

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

1. In a guard rail structure, the combination with the main rail, of a chair, a guard
 125 rail head having a substantially horizontally extending head substantially wider than the main rail head and adapted to overlie the chair and a depending imperforate web short in relation to the head, and means
 130

engaging the web and chair adapted to hold the guard rail in place on the chair.

2. In a guard rail structure, the combination with the main rail, of a guard rail and
5 a guard rail chair comprising guard rail supporting means extending up alongside, and spaced from the main rail, and removable means, not engaging the main rail and carried by said supporting means and not
10 penetrating the guard rail and between which and said supporting means the guard rail is adapted to be clamped and held in position on the chair.

3. In a guard rail structure, the combination with a guard rail, of a chair on which the guard rail is supported, means for holding the guard rail in fixed relation to the chair, the chair having a transversely extending slot, a clip overlying said slot and
20 engaging the chair and having a bolt receiving orifice, and a bolt adapted to extend through said clip and slot, whereby said guard rail may be adjusted outwardly without changing the position of the securing
25 bolt.

4. In a guard-rail structure, the combination with the main rail, the guard rail, and the base plate of the chair movable transversely relatively to the main rail, securing means engaging the main rail and
30 base plate, chair members extending upward from the base plate and spaced from the main rail, and means to hold the guard rail in position on the chair members.

5. In a guard rail structure, the combination with a chair, comprising a base plate and an upwardly extending portion, of a guard rail having a head and web, said web contacting on one side only with the upward
40 extending portion of the chair, and means not penetrating the web and engaging the chair and the opposite side of the web adapted to hold the guard rail in position on the chair.

6. In a guard rail structure, the combination with a guard rail comprising a head and web, of a base plate, chair members projecting upward therefrom and having a pocket adapted to receive the web, and a
50 wedge adapted to be driven into the pocket between one wall thereof and the web.

7. In a guard rail structure, the combination with a guard rail comprising an elongated head having a relatively thick
55 outer portion adapted to receive the thrust of the car wheels and a relatively short web depending from the outer portion of the head, of a chair adapted to receive the rail, and means to hold the rail in place in the
60 chair.

8. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair comprising a member which the inner portion of the guard rail
65 head is adapted to overlie and a member

which the outer portion of the guard rail head is adapted to overlie, said guard rail web being adapted to extend within the pocket formed between said members, and means to hold the web in said pocket. 70

9. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair comprising a member which the inner portion of the guard rail head is adapted to overlie and a member
75 which the outer portion of the guard rail head is adapted to overlie, said guard rail web being adapted to extend between said members, and a wedge adapted to be driven between the inner member and the web and
80 force said web against the outer member and retain it in position.

10. In a guard rail structure, the combination with a guard rail comprising a head and a web whose outer face extends downwardly and forwardly, of a chair comprising a member which the inner portion of the guard rail head is adapted to overlie and which extends at an angle to the rail, and a member which the outer portion of
85 the guard rail head is adapted to overlie and which is provided with an overhanging inner wall, said guard rail web being adapted to be inserted within said pocket and moved against said wall of the last named
90 member, and a wedge adapted to be inserted between the first named member and the guard rail web.

11. In a guard rail structure, the combination with a guard rail comprising a head
100 and a web, of a chair comprising a base, a pair of webs, ribs connecting the webs and forming the floor and inner wall of a pocket, and a jaw between said webs forming the outer wall of the pocket, said guard rail
105 web being adapted to extend within said pocket, and means to confine said web in place within the pocket.

12. In a guard rail structure, the combination with a guard rail comprising a head
110 and a web whose outer face extends downwardly and outwardly, of a chair comprising a base, a pair of webs and a connecting vertically-extending rib which the inner portion of the guard rail head is adapted
115 to overlie, a horizontally extending rib connecting said webs, said ribs extending at an angle to the guard rail, a jaw between and extending outside said webs which the outer portion of the guard rail head is
120 adapted to overlie and whose inner wall extends upwardly and inwardly, said guard rail web being adapted to be inserted between said vertical rib and jaw and moved against the inner wall of the jaw, and a
125 wedge adapted to be driven between the last named rib and the jaw.

13. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending
130

upwardly therefrom adapted to support the guard rail, and a clip having a bolt orifice therein eccentrically located and adapted to engage the outer portion of the base-plate and the main rail.

14. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, a clip having flanges of varying width and adapted to engage the outer portion of the base plate and the main rail, and a bolt adapted to extend through said clip and a slot in the base plate.

15. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, a lip at the outer portion of the base-plate, and a square-shaped bolt-engaging clip adapted to be confined between the main rail and said lip, said clip having a pair of flanges along two adjacent sides extending in line with one face of the clip and a pair of flanges along the remaining two sides extending in line with the other face of the clip, said flanges being of varying width, whereby the clip may be either turned from a given position or reversed to enable the chair to be adjusted from or toward the main rail.

16. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, and a clip having a bolt orifice therein eccentrically located and adapted to engage a recess in the inner portion of the base plate.

17. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, and clips having bolt orifices therein eccentrically located, one of said clips being adapted to engage the outer portion of the base-plate and the main rail and the other of said clips being adapted to engage the inner portion of the base plate.

18. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, said base plate being provided at the inner portion thereof with a slot and a ridge extending above the plate adjacent to said slot, and a square-shaped clip having a bolt orifice therein at varying distances from its four edges, said clip being adapted to overlie said slot and abut against said ridge.

19. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the

guard rail, said base plate being provided at its outer and inner portions and between its ends with longitudinally extending slots, a ridge extending above the plate adjacent to the innermost slot, a lip on the outer portion of the plate, a pair of clips having bolt orifices therein eccentrically located, one of said clips being adapted to overlie the innermost slot and abut against said ridge, and the other of said clips being adapted to overlie the outermost slot and be confined between said lip and the main rail, and a third clip adapted to overlie the intermediate slot and engage the main rail.

20. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair comprising a base plate and members extending upwardly therefrom and forming a pocket to receive the guard rail web, means to hold the guard rail within its pocket, said base plate having slots at its inner and outer portions, clips, each having bolt holes therein at varying distances from its edges, said clips being adapted to overlie said slots respectively and the outer clip being adapted to engage the main rail, and means on the plate adjacent to each clip against which clips are adapted to abut.

21. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, said base plate having a bolt receiving slot in its outer portion, a clip adapted to overlie said slot, a main-rail engaging flange on said clip, and means on the plate adjacent to said clip against which said clip is adapted to abut.

22. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, said base having bolt receiving slots at its outer and inner portions respectively, a main-rail-engaging clip adapted to overlie the outer slot, a clip adapted to overlie the inner slot, and means on the plate adjacent to the last named clip against which the same is adapted to abut.

23. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, members extending upwardly therefrom adapted to support the guard rail, said base having bolt receiving slots at its inner and outer ends and between its ends, clips adapted to respectively overlie said slots, main rail engaging flanges on the outside and middle clips, and means on the plate adjacent to the outer and inner clips against which said clips are adapted to respectively abut.

24. In a guard rail structure, the combination with a guard rail, of a chair comprising a base plate, means extending upwardly therefrom adapted to support the guard rail,

and means engaging the base plate and not engaging the guard rail permitting adjustment of the chair forwardly as the front of the guard rail wears.

5 25. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair adapted to support the guard rail and having a member extending under the head and spaced from said web, 10 and a wedge adapted to be driven into the space between said guard rail web and said chair member.

15 26. In a guard rail structure, the combination with the rail tie, the main rail, the guard rail, and the guard rail chair adapted

to support the guard rail and having a base plate underlying the main rail and movable transversely relatively thereto, of bolts engaging the tie, and means coöperating with the bolts to secure the base plate, in its different adjusted positions, to the rail tie and the main rail without changing the positions of said bolts. 20

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 18th day of May, 1909. 25

GEORGE B. TAYLOR.

Witnesses:

M. M. HAMILTON,
E. E. WALL.