G. B. TAYLOR.

GUARD RAIL STRUCTURE.

APPLICATION FILED MAY 28, 1909.

947,317.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.

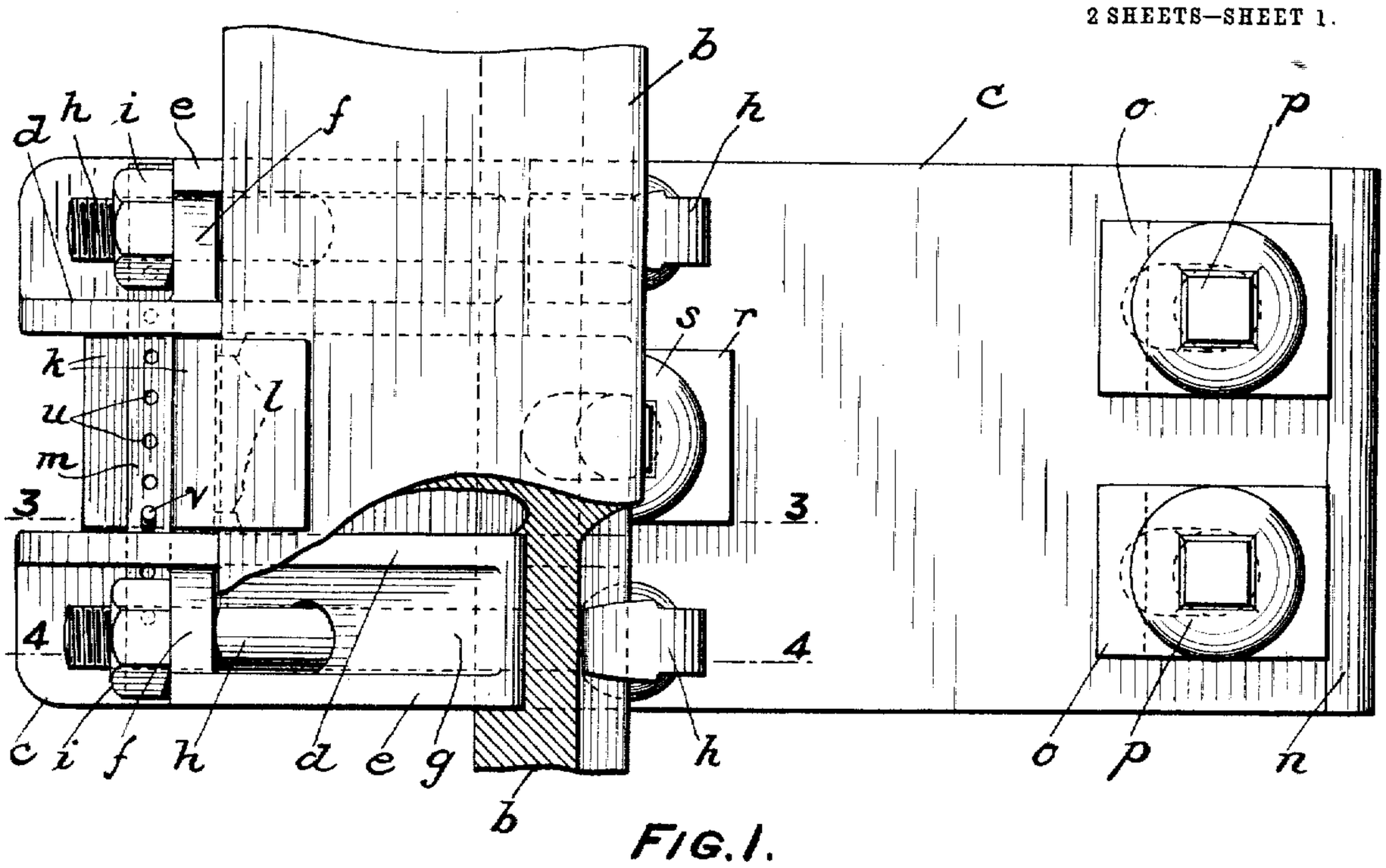

FIG. 1.

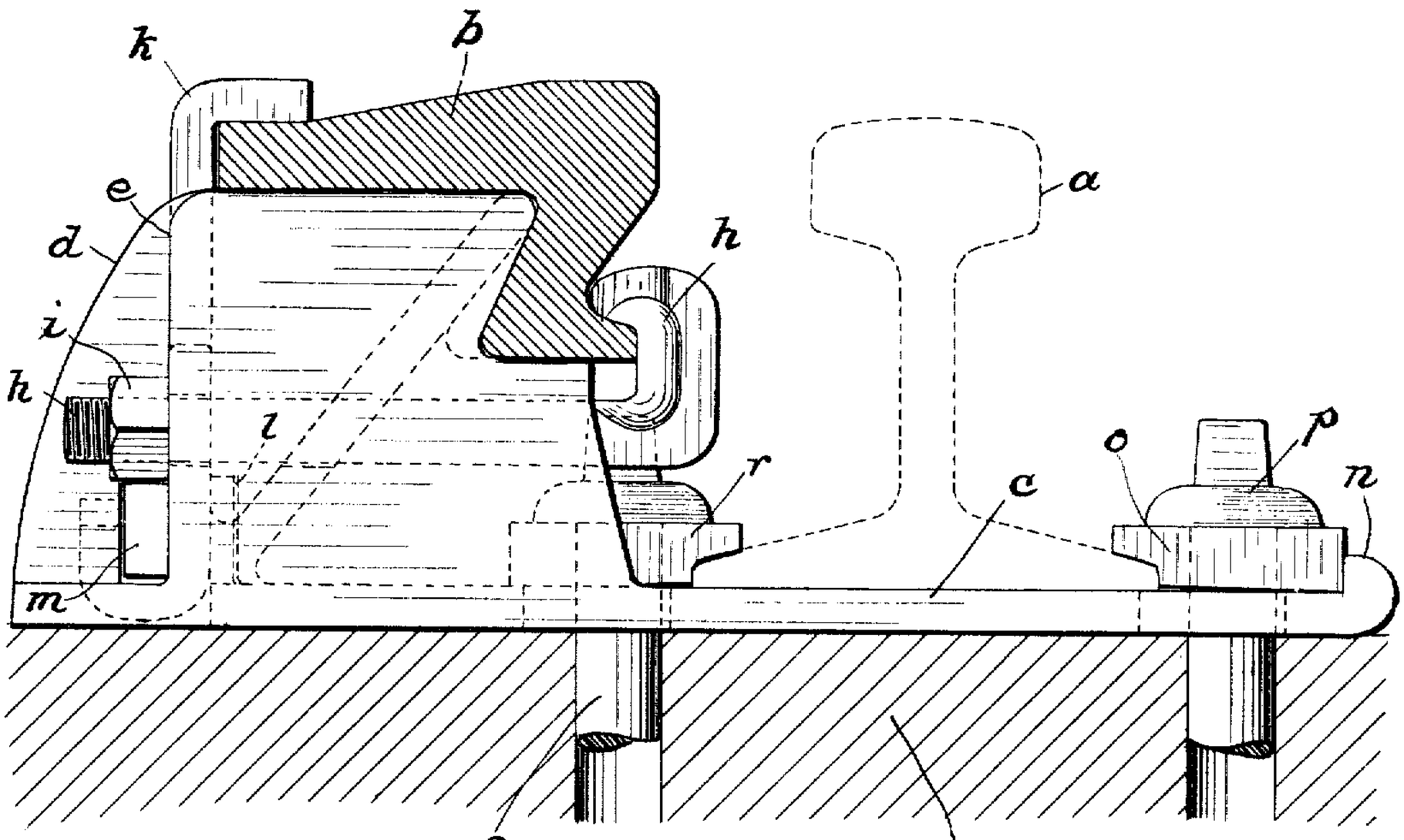

FIG. 2.

WITNESSES:

Robt R Litchel.

E. E. Hall

INVENTOR

George B. Taylor

BY

Harding & Harding

ATTORNEYS.

G. B. TAYLOR.

GUARD RAIL STRUCTURE.

APPLICATION FILED MAY 28, 1909.

947,317.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 2.

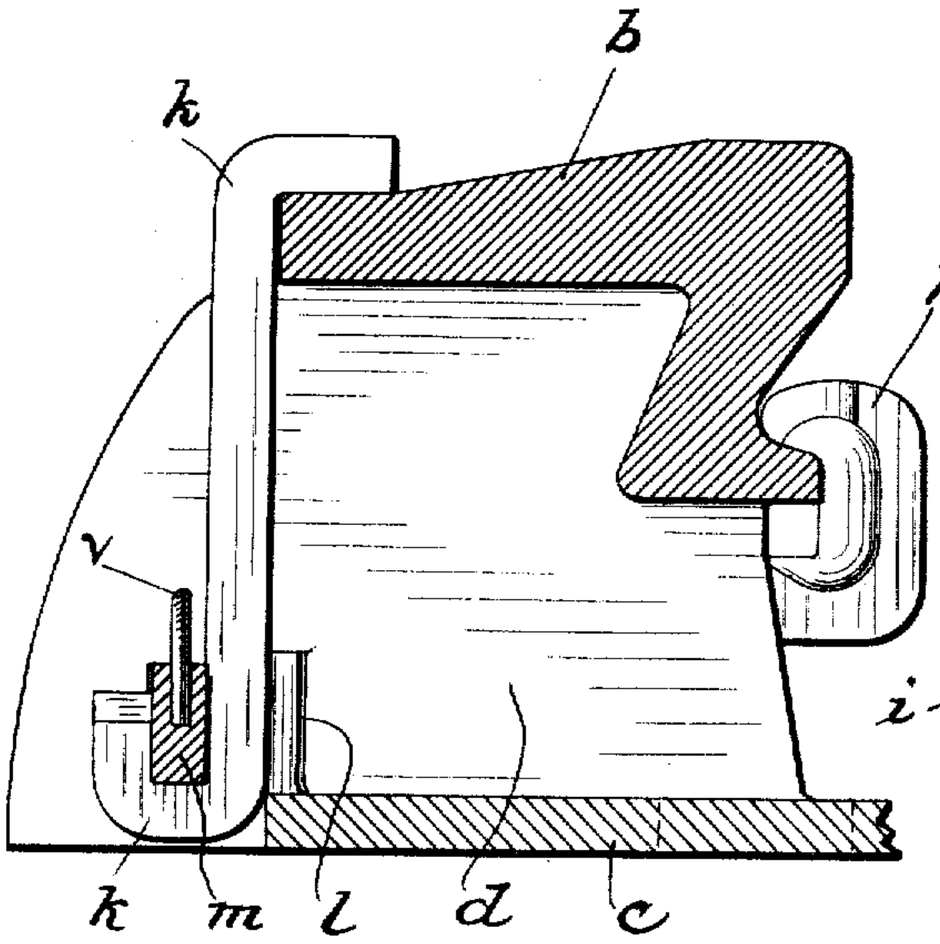

FIG. 3.

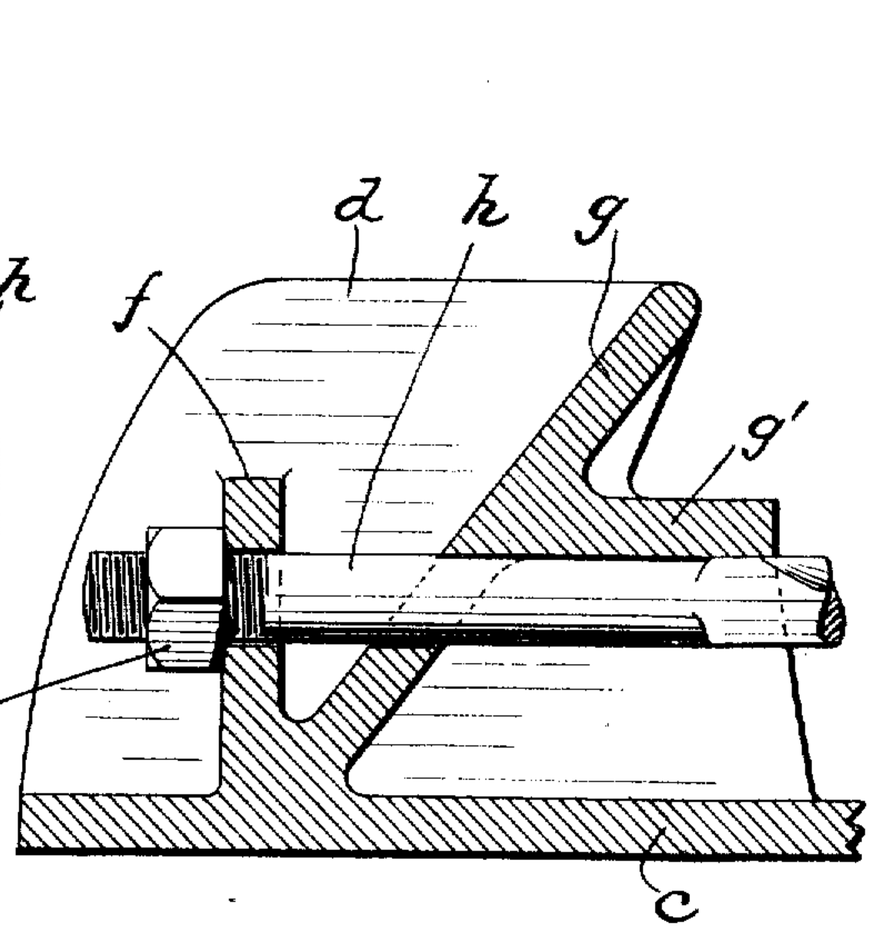

FIG. 4.

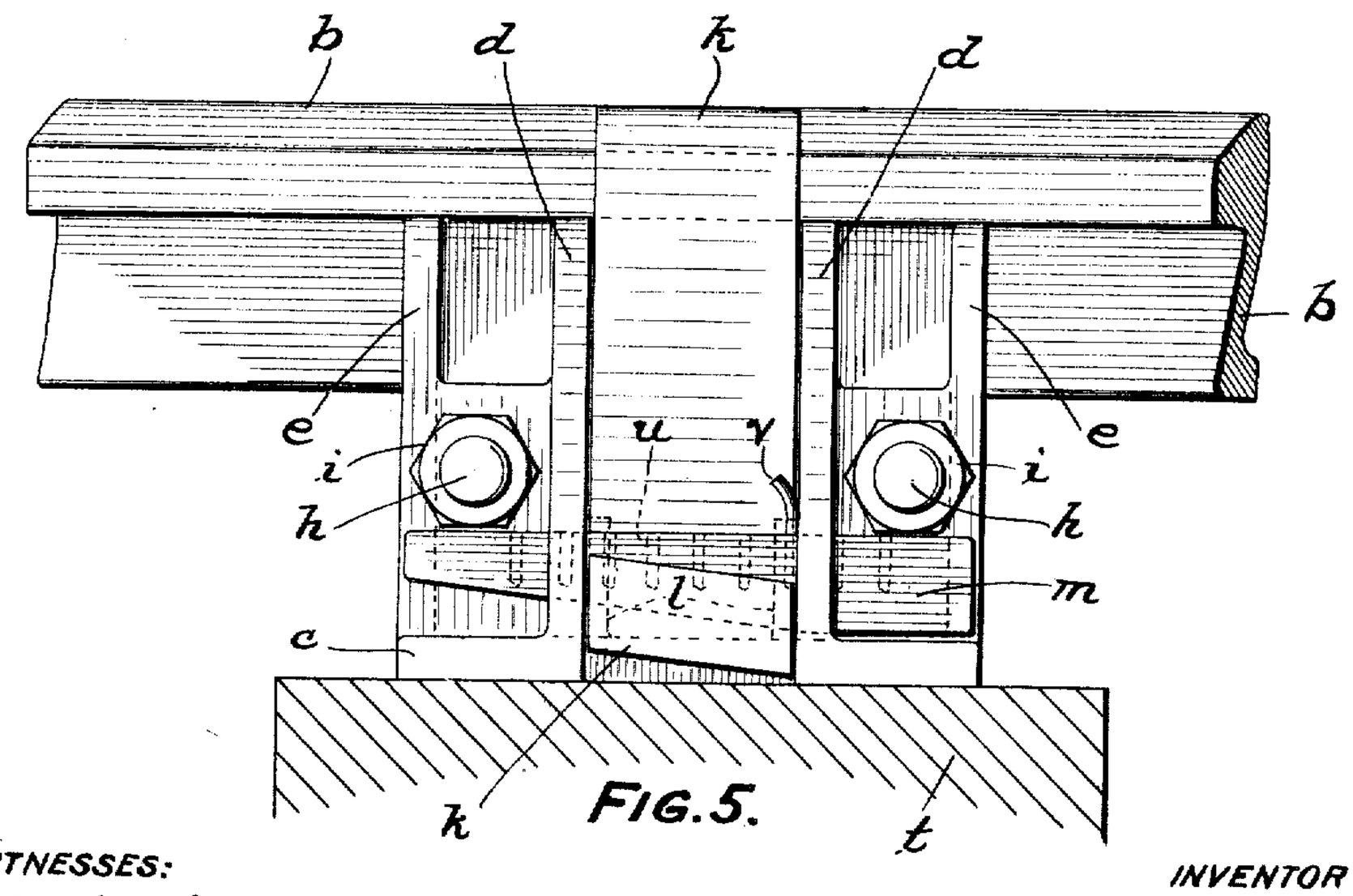

FIG. 5.

WITNESSES:

Robt. R. Kitchel.

E. E. Hall

INVENTOR

George B. Taylor

BY Harding & Harding

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE B. TAYLOR, OF PHILADELPHIA, PENNSYLVANIA.

GUARD-RAIL STRUCTURE.

947,317. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed May 28, 1909. Serial No. 498,996.

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 meets 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.

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, the guard rail being partly broken away; Fig. 2 is a side elevation of the structure; Fig. 3 is a section of part of the structure on the line 3—3 of Fig. 1; Fig. 4 is a similar section on the line 4—4 of Fig. 1; Fig. 5 is an end view of the structure.

a is the main rail and *b* the guard rail.

c is the base plate of the chair.

Projecting upwardly from the base plate are two chair members, spaced apart, each consisting of webs *d* and *e* extending longitudinally of the chair, and an upright rib *f* and an upwardly and forwardly extending rib *g* connecting the webs *d* and *e*. The inner web *d* of each chair member extends substantially to the rear of the outer web *e* and preferably to the rear end of the base plate, and the rear face of the rib *f* alines with the rear end of the web *e*. A third and horizontally extending rib *g'* connects the webs *d* and *e* forwardly of the rib *g*.

The guard rail comprises an elongated head and a relatively short web and 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 rear toward its front so as to present a relatively thick front to receive the thrust or impact of the wheel flanges. The web depends from the front of the head and is hollowed out or recessed in its front face to receive the hooked end of the hook bolts *h* hereinafter described. The bottom surfaces of the head and web are preferably flat, and the rear face of the web slopes downwardly and rearwardly as shown. The webs *d* to conform to the lower surfaces of the head and web, and the rear face of the web, of the guard rail, and the guard rail rests directly upon the webs *d* and *e* and the connecting rib *g'*.

To hold the guard rail in position on the chair, the following means are provided. *h*, *h*, are hook bolts extending longitudinally of the chair through the ribs *f* and *g* of the two chair members, their hooked ends curving upwardly and rearwardly and extending into the recessed front face of the guard rail web. *i*, *i*, are nuts, on the rear of the bolts, that tighten against the webs *e* and ribs *f* of the rail chair members. *k* is a clamp having at its upper end a flange overlying the rear end of the guard rail head, while its lower end extends rearwardly and upwardly in hook form. The clamp *k* extends between the chair members and the rearwardly extending portion of its hooked end is inclined, in a transverse direction, somewhat to the horizontal, thereby forming a pocket having a sloping floor adapted to coöperate with the wedge *m*. *l*, *l*, are projections on the inner ribs *d*, *d*, of the two chair members, which projections hold the lower end of the clamp *k* from moving forwardly. *m* is a wedge adapted to be driven transversely into the

pocket formed by the hooked lower end of the clamp *k*. The length of the wedge corresponds approximately to the width of the chair. The webs *d*, *d*, of the two chair members are cut away to receive the wedge. When the wedge is driven, its upper horizontal edge engages the webs *d*, *d*, while its inclined lower edge engages the inclined lower wall of the pocket formed by the hooked lower end of the clamp *k*.

The rail chairs, with the hook bolts *h* inserted, are placed in position under the main or running rail before the guard rail is placed, it being, of course, necessary to insert the hook bolts from the front of the chair. After the guard rail is placed in position, the nuts *i* are tightened, thereby forcing the guard rail rearwardly against the ribs *d*, *e* of the chair members. The clamp *k* is then applied and the wedge *m* driven. The wedge *m* performs the double function of holding down the rear end of the head of the guard rail and of locking the nuts *i* from turning. While the bolt *h* assists in holding the guard rail to the chair, and to that extent performs the function of an ordinary fastening bolt, it is not likely to be broken in normal use, as practically no strain is imposed thereon, the entire strain being resisted virtually solely by the chair members, the construction of which is such as to adapt them to receive and resist the vertical and rearward thrust to which the guard rail is exposed.

To hold the chair to the ties the following means are provided: The outer or front end of the base plate *c* is provided with a lip *n*, between which and the contiguous flange of the main rail are inserted two clips *o* which partly overhang said flange. Screw spikes *p* extend through the clips and through slots in the base plate *c* into the tie *t*. A third clip *r* rests on 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 *s* extending through the clip *r* and through a slot in the base plate into the tie *t*.

If, owing to the wearing away of the front face of the guard rail, it becomes desirable or necessary to move the guard rail forwardly toward the main rail to compensate for the wear, this may be done without forming new spike holes in the tie by removing the clips *o* and spikes *p*, loosening the spike *s*, sliding the chair toward the main rail, then substituting for the clips *o* other and wider clips whose spike holes, however, are at the same distance from their inner ends as are the spike holes of clips *o*, and then re-inserting the spikes *p* and tightening them and the spikes *s*. Instead of substituting new clips *o* for those withdrawn, the clips *o* may be specially constructed to permit them to be continued in use notwithstanding the described shifting forward of the chair. Such a specially constructed clip is disclosed in an application filed by me May 20, 1909, Serial No. 497,349.

Different expedients for holding the wedge *m* in position may be adopted. For example, a series of holes *u* may be formed in the upper face of the wedge, and in the hole nearest the web *d* of one of the chair members, after the wedge is driven in place, may be inserted a pin or rivet *v*.

A guard rail, supported and braced as hereinbefore described, is well 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 the hook bolts and clamp are not subjected to strains or stresses of sufficient severity to cause their breakage.

The guard rail structure hereinbefore described has certain features of novelty in common with the guard rail structure set forth in my said prior application filed May 20, 1909, and the invention common to both structures is claimed in certain of the claims of said prior application. While I do not herein intend to confine myself to the details of construction hereinbefore enumerated except where specifically claimed, it is not intended to cover herein the subject matter common to the structures of both applications.

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 guard rail chair, a guard rail having a head and depending web, the face of the web more remote from the main rail abutting against the chair, and removable means, not engaging the main rail and engaging the chair and the face of the web opposite the main rail, adapted to hold the web in position on the chair.

2. In a guard rail structure, the combination with a main rail, of a guard rail comprising a head and a depending web, a rail chair adapted to support the guard rail, and removable means, supported on the chair and not penetrating the guard rail and engaging the face thereof opposite the main rail, adapted to hold the guard rail against the chair.

3. In a guard rail structure, the combination with a guard rail comprising a head and web, of a rail chair adapted to support the guard rail, a transversely extending bolt engaging but not penetrating the web of the guard rail and a clamp engaging the head of the guard rail, said clamp and bolt cooperating to hold the guard rail in position on the chair.

4. In a guard rail structure, the combination with a guard rail comprising a sub-

stantially horizontally extending head and a web depending therefrom, of a rail chair adapted to underlie the head of the guard rail and against which the web of the guard rail is adapted to abut, a transversely extending bolt not penetrating the web of the guard rail and engaging the opposite and wheel-thrust-receiving face thereof, and a clamp engaging the head of the guard rail, said clamp and bolt coöperating to hold the guard rail in position on the chair.

5. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair adapted to receive the vertical and rearward thrust of the guard rail, and means respectively engaging, but not penetrating, the front of the web, and top of the head, of the guard rail and holding 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 chair adapted to receive the vertical and rearward thrust of the guard rail, means engaging the top of the head and means engaging but not penetrating the front of the web adapted to coöperate to hold the guard rail in position on the chair.

7. In a guard rail structure, the combination with a guard rail comprising a head and a web having a recessed front face, of a chair supporting the guard rail, and a hook bolt, extending underneath the guard rail web and engaging the chair, whose hooked end engages the recessed face of the guard rail.

8. In a guard rail structure, the combination with a guard rail comprising a head and a web, of a chair supporting the guard rail, a vertically extending clamp having an inturned end overlying the guard rail head, and a wedge engaging the chair and the lower end of the clamp and adapted to draw or hold the clamp downwardly, thereby holding down the head of the guard rail.

9. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair comprising a base plate and a plurality of members spaced apart and underlying and supporting the guard rail, a clamp extending between said members and engaging the guard rail head, and a wedge engaging the chair members and the clamp.

10. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair supporting the guard rail, a hook bolt engaging the chair whose hooked end engages the front face of the guard rail web, a vertically extending clamp having an inturned end overlying the guard rail head, and a wedge engaging the chair and the lower end of the clamp and adapted to draw or hold the clamp downwardly.

11. In a guard rail structure, the combination with a guard rail comprising a head and web, of a chair supporting the guard rail, a bolt engaging the guard rail web, a tightening nut on said bolt, a clamp engaging the guard rail head, and a wedge adjoining the nut and engaging the chair and the clamp and adapted to lock the nut and tighten the clamp.

12. In a guard rail structure, the combination with a guard rail, of a rail chair comprising a base plate and two pairs of webs extending upwardly therefrom and transverse ribs connecting the webs of a pair, thereby forming two chair members spaced apart, said webs being shaped to substantially conform to and support the guard rail, and means engaging the chair and guard rail and adapted to hold the latter in position.

13. In a guard rail structure, the combination with a guard rail comprising a head and a web depending from the front portion thereof, of a chair comprising a base plate and webs projecting upwardly therefrom underlying the head and web of the guard rail and abutting against the rear face of the web, a transverse rib connecting the rear end of one of said webs with the other web, a transverse rib connecting said webs and extending toward the junction of the web and head of the guard rail, a hook bolt extending through said ribs and engaging the front face of the guard rail web, and a nut on said bolt tightening against the rear of one of the webs and the rear rib.

14. In a guard rail structure, the combination with a guard rail comprising a head and a web depending from the front portion of the head, of a chair comprising a base plate and webs projecting upwardly therefrom underlying the head and web of the guard rail and abutting against the rear face of the web, transverse ribs connecting said webs, a vertically extending clamp having an inturned end overlying the rear end of the guard rail and a hooked lower end forming a pocket having a transversely inclined floor, and a transversely extending wedge engaging said clamp pocket and one or more of said webs.

15. In a guard rail structure, the combination with a guard rail comprising a head and a web depending from the head, of a chair comprising a base plate and two chair members projecting upwardly therefrom and underlying the head and web of the guard rail and abutting against the rear face of the web, hook bolts extending through said chair members respectively and engaging the front face of the guard rail web, nuts on said bolts, a clamp extending between the chair members and engaging the head of the guard rail, and a wedge engaging the chair members and the clamp and extending alongside said nuts and thereby tightening the clamp and locking the nuts.

16. In a guard rail structure, the combination with a guard rail comprising a head and a web, of a chair comprising a base plate having a plurality of slots near its front end and a slot between its ends, a plurality of chair members underlying the guard rail and abutting against the rear face of the guard rail web, means to hold the guard rail in place on the chair members, main rail engaging clips overlying said slots, means at the front of the base plate against which the front clips are adapted to be confined, and spikes engaging said clips and slots.

17. In a guard rail structure, the combination with a guard rail comprising an elongated head and a relatively short web depending from the front portion thereof, of a chair comprising a base plate and two chair members projecting upwardly therefrom and underlying the head and web of the guard rail and abutting against the rear face of the web; each chair member comprising two webs, one extending to the rear of the other, a transverse rib connecting the rear of the last named web with the other web and a transverse rib connecting said webs and extending toward the junction of the web and head of the guard rail; a hook bolt, extending through the ribs of a chair member, whose hooked end engages the front face of the guard rail web, a nut on each bolt tightening against the rear of the shorter web and the rear transverse rib, a clamp extending vertically between said chair members and having an inturned end overlying the rear end of the guard rail head and a hooked lower end forming a pocket having a transversely inclined floor, a wedge, extending transversely through orifices in the longer webs whose upper edge engages said webs and underlies the nuts on the hook bolts and whose lower inclined edge engages the inclined floor of the clamp pocket.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 26th day of May, 1909.

GEORGE B. TAYLOR.

Witnesses:

FRANK S. BUSSER,

M. M. HAMILTON.