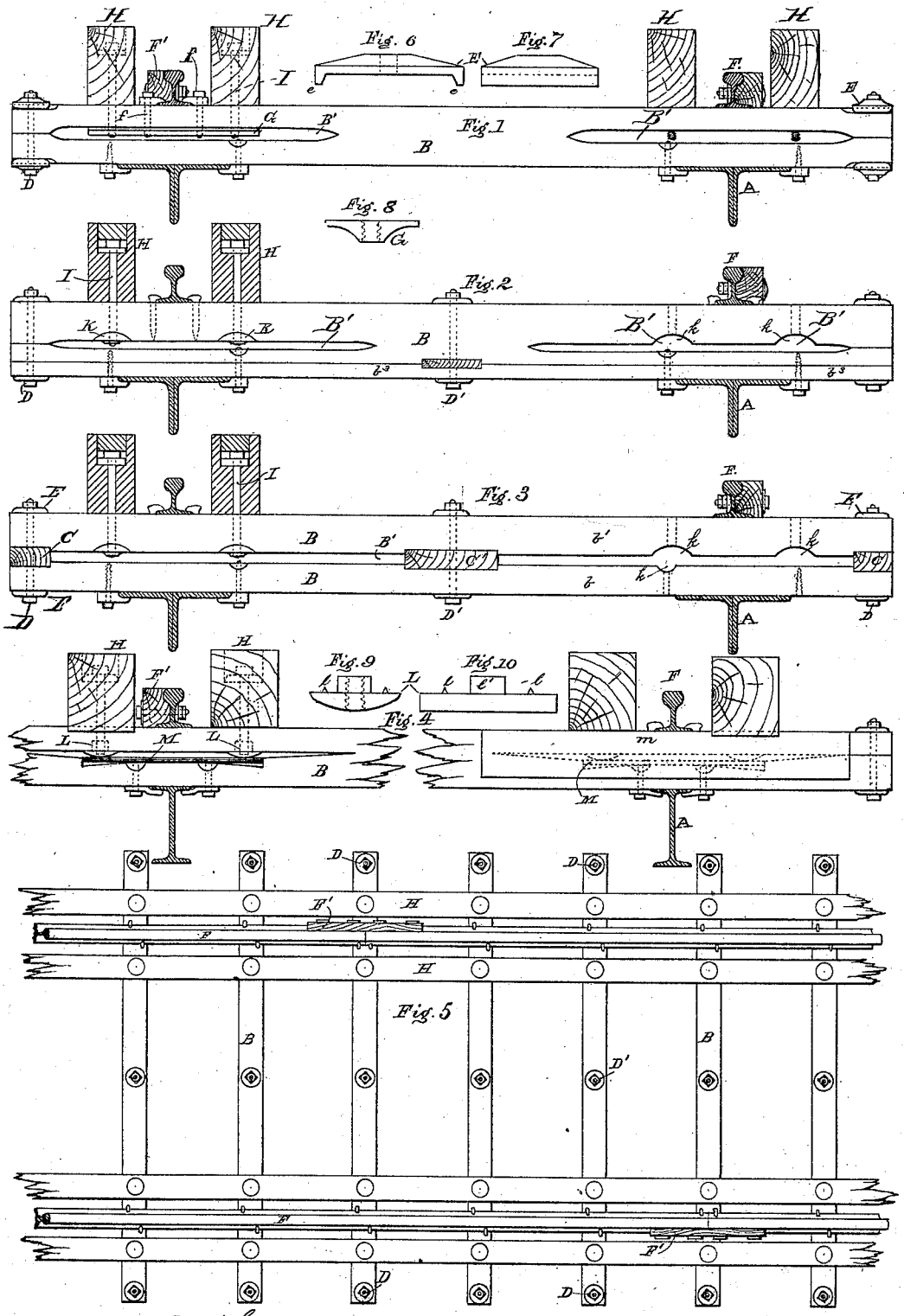
O. C. WOOLSON.

Flexible Railway System.

No. 212,827. Patented Mar. 4, 1879.



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UNITED STATES PATENT OFFICE.

OROSCO C. WOOLSON, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN FLEXIBLE-RAILWAY SYSTEMS.

Specification forming part of Letters Patent No. **212,827**, dated March 4, 1879; application filed September 21, 1878.

To all whom it may concern:

Be it known that I, OROSCO C. WOOLSON, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Flexible-Railway Systems, of which the following is a full and clear description.

This invention relates to the construction of the railway-ties and guard-rails which are used upon bridges or elevated railways in such a manner as to permit them to yield by flexure under the pressure of a passing train to such an extent as to materially lessen the concussions on the roadway, and also on the rolling-stock of the road; and this diminution of shocks will also necessarily reduce to a minimum the concussions imparted to the surrounding air, and a proportionate reduction of the sound-waves or noise will therefore be the ultimate result, as well as the attendant benefit of increased durability to the roadway and its rolling-stock.

The subject of the invention is a flexible railway-tie, made in one or more pieces, and composed of upper and lower elastic members, with slots or openings between them, so combined with its supports and with the rails that both members supply elasticity to the track, as hereinafter explained.

The parting-blocks used between the upper and lower sections of the ties are similar to those frequently used between the different sections of bridge-chords.

The rails are to be placed upon and secured to the ties over the slots, so as to secure a yielding bed or seat for the rails. The wooden guard-rails, which lie parallel with the metal rails, are to be bolted down to the upper part of the ties, so as to add to the strength of each individual tie by connecting it by means of the said guard-rails with several contiguous ties. This construction gives to the ties and guard-rails the effect of a continuous yielding platform, which yields vertically during the passage over it of a load, and immediately resumes its normal position after the passage of the train or load. The ties rest upon the truss-chords or floor-beams of the structure in such a manner as to have a flexible part of the tie, or the slot in it, directly over the rigid support, thus securing all the rigidity for the substructure and all the flexibility for the roadway that is possible.

The metallic rails are to be bolted to the flexible parts of the ties with bolts of a peculiar construction, and wooden splicing-bars are used to overlap the ends of contiguous rails, so as to hold them securely and relatively fixed to the yielding ties in such a manner that the whole may form a firmly-united but yielding platform or road-bed.

Various details of the construction will be hereinafter more fully described.

The invention will be fully understood by reference to the accompanying drawings, of which—

Figures 1, 2, 3, and 4 are transverse sectional elevations of a road-bed, showing the slotted ties in side elevation. Fig. 5 is a general plan. Figs. 6 and 7 are details of washer-clamps for the ends of ties. Fig. 8 is a detail of a re-enforcing nut-plate for rail-bolts. Figs. 9 and 10 are details of guard-rail-bolt nuts.

A represents the floor beam or truss upon which the ties rest.

The ties B are to be constructed with transverse longitudinal slots B′, either by cutting out the slots from the solid wood, as in Figs. 1, 2, and 4, or by forming the tie in two pieces, b and b^1, as in Fig. 3. When the latter form is used it will be necessary to place parting-blocks C and C′ between the two constituent parts b and b^1 of the tie B. These parting-blocks will be let into transverse seats or notches formed in the contiguous faces of the tie-pieces b and b^1, which said seats will be, say, one-half an inch deep, more or less. The center block, C′, will be fitted tightly into its seats, and will thereby hold the two pieces b and b^1 in their proper positions relatively, and prevent their longitudinal displacement.

In order to utilize material now on hand or in use, a re-enforcing-piece, b^3, may be added to the bottom of the old tie, as in Fig. 2. In either case clamping-bolts D will be placed vertically through the ends of the ties, as in Figs. 1, 2, 3, and 4, and also central clamping-bolts, D′, where the tie is made of two pieces, as in Figs. 2 and 3. The end clamping-bolts, D, will pass through clamping washer-plates E, which are shown in detail in Figs. 6 and 7. These plates have lugs e projecting from their

inner faces for, say, half an inch, (more or less,) as shown best in Fig. 6. These lugs, when the parts are assembled together, will overlap the sides of the tie, and prevent it from splitting, as it otherwise possibly would.

The metallic rails F cannot always be fastened to the ties by the ordinary method of spiking, because of the thinness of the tie-pieces; therefore screw-bolts *f* will be used for this purpose when the top part of the tie is too thin to hold a spike. These bolts will be threaded into a nut-plate, G, which is shown in Fig. 1 and in detail in Fig. 8, the last-named figure being a transverse section of the said plate. This nut-plate is also tapped for the bolts I of the guard-rail, and also forms a washer-plate to rest against the wood, and likewise a re-enforcing-plate to strengthen the wood in cases where the wood is cut away so as to leave but a thin part above the slot.

The guard-rails H are to be bolted down to the upper part of the ties by the vertical bolts I, which serve the double purpose of holding the guard-rails down to the ties, and also the ties up to the guard-rails, thus transmitting the pressure placed upon one tie over onto the contiguous ties by means of the connecting guard-rails, and forming the whole roadway into a continuous yielding or flexible platform.

The bolts I will be threaded on their lower ends, and screw either into the nut-plate G, above described, or into the transverse nut K or L, either of which will be adapted for this use under certain conditions, which will be determined by the kind of ties that are being used.

The nuts K, Fig. 2, are flat-faced on the bottom side and convex-faced on the top side, the convex side being intended to fit into concave grooves *k*, placed across the bottom face of the tie. The ends of these nuts and the grooves in which they are to be seated are shown in Figs. 2 and 3. The length of the nut-piece in this case will be equal to the width of the tie, and when the nut is tightly drawn up into its groove in the tie it will act as a lock-nut.

The nuts L are shown in detail in Figs. 9 and 10, Fig. 9 being an end elevation and Fig. 10 a side elevation. These nuts are convex-faced on the bottom side and flat-faced on the top side, with short spurs *l* projecting from the flat faces, so as to enter the wood of the tie and prevent the nut from turning when the bolt is tightly screwed into it. A boss, *l'*, on the top side of this plate affords increased thread for the screw.

When in position the bottoms or convex sides of these nut-plates L form seats or rests for the top part of the tie-pieces to rest upon a metallic spring-plate, M, as shown in Fig. 4. These spring-plates M, preferably made of spring-steel, will lie in cavities formed for them in one of the tie-pieces *b* or *b*^{1}, as is also shown in Fig. 4, with the center of the said spring resting upon a convexed part of its seat, or upon a lug or seat especially formed for it, so as to leave both of its ends free. As the weight of a passing load is placed upon the top part of the tie these nuts will impinge upon the ends of the spring-plates, and so will receive the requisite flexibility, combined with the necessary strength, even in a diminished tie, as may be sometimes required.

Side pieces or housings, *m*, will be secured to the sides of the tie, so as to hold the springs M properly within their seats. These housing-pieces may cover the whole or a part of the seats of the said springs M. The metallic rails F will have splicing-bars of wood, F', placed across each of the joints of the rails, as shown in Figs. 1, 4, and 5. These splicing-bars will be made of the best quality of hard wood—as, for instance, white oak—and they will be constructed so as to fit the outside form of the rail and extend for its full height, so as to rest firmly upon the tie, and also form a tread or top face of the same height as the metallic rail, and of a width equal to the width of the metallic rail. These pieces will be firmly bolted to the metallic rail, and fitting it closely, as above described, and also resting firmly upon the ties. The whole will be secured firmly yet flexibly together, so as to be admirably adapted to the purposes of a flexible road-bed.

Having described my invention, I claim—

1. A railway-tie composed of upper and lower elastic members, separated by bearing-blocks or by a portion of the material from which they are formed, in combination with the rails and supporting-beams, in such manner that both members supply elasticity to the tie, as set forth.

2. The guard-rails H, the upper portion of the slotted tie B, and the holding-bolts I, combined and arranged together so as to use the guard-rail as such, and also as a flexible beam, to transmit the load, or a part of it, from one tie to the adjacent ties, substantially as described and set forth.

3. The spring-plates M, in combination with the slotted tie B and the convex bearings L, as described and set forth.

4. The rail F, the slotted tie B, the re-enforcing-plate G, and the bolts *f*, combined and arranged as and for the purpose set forth.

5. The re-enforcing nut-plates G, in combination with the slotted ties B, rails F, and guard-rails H, as and for the purposes set forth.

6. The nuts L, constructed with convex bottom faces, in combination with the slotted ties B, guard-rails H, springs M, and rails F, as and for the purposes set forth.

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