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G. H. THOMSON.

ELEVATED RAILWAY STRUCTURE.

APPLICATION FILED JULY 17, 1902.

NO MODEL.

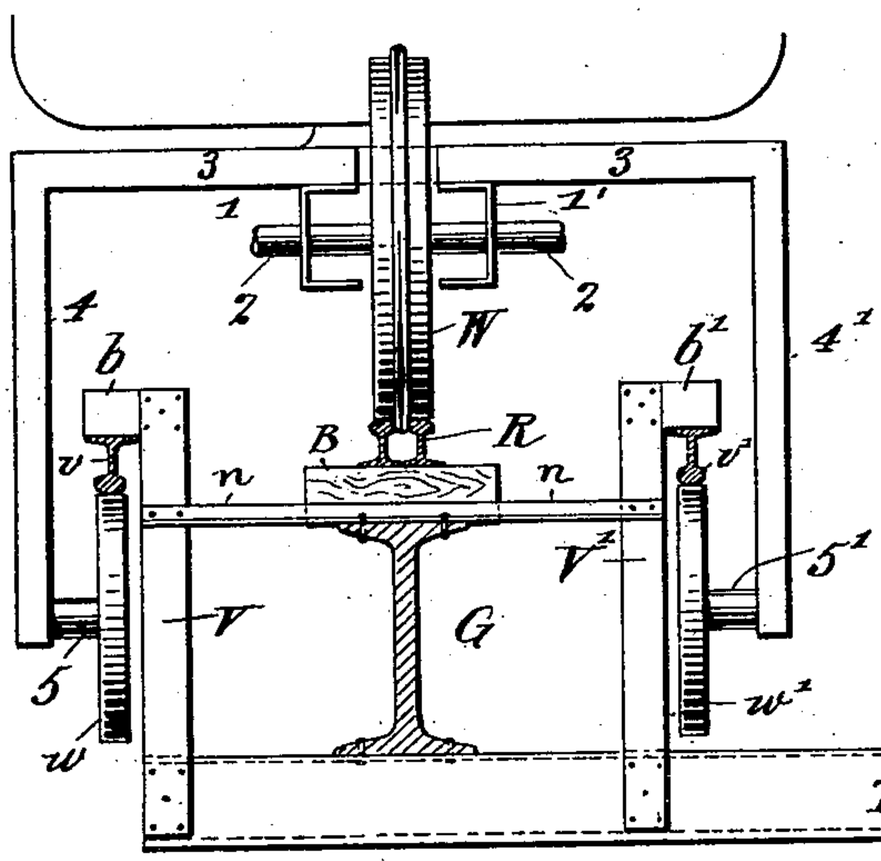
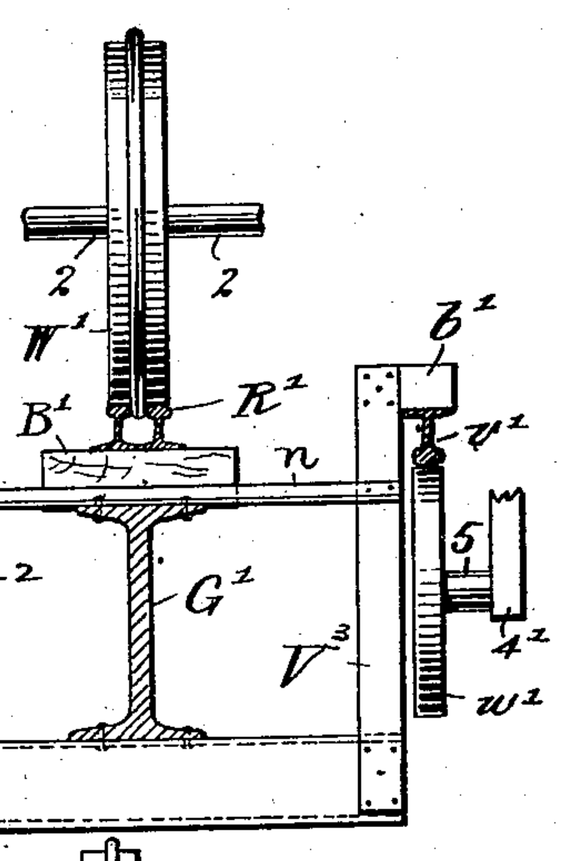


Fig. 1.



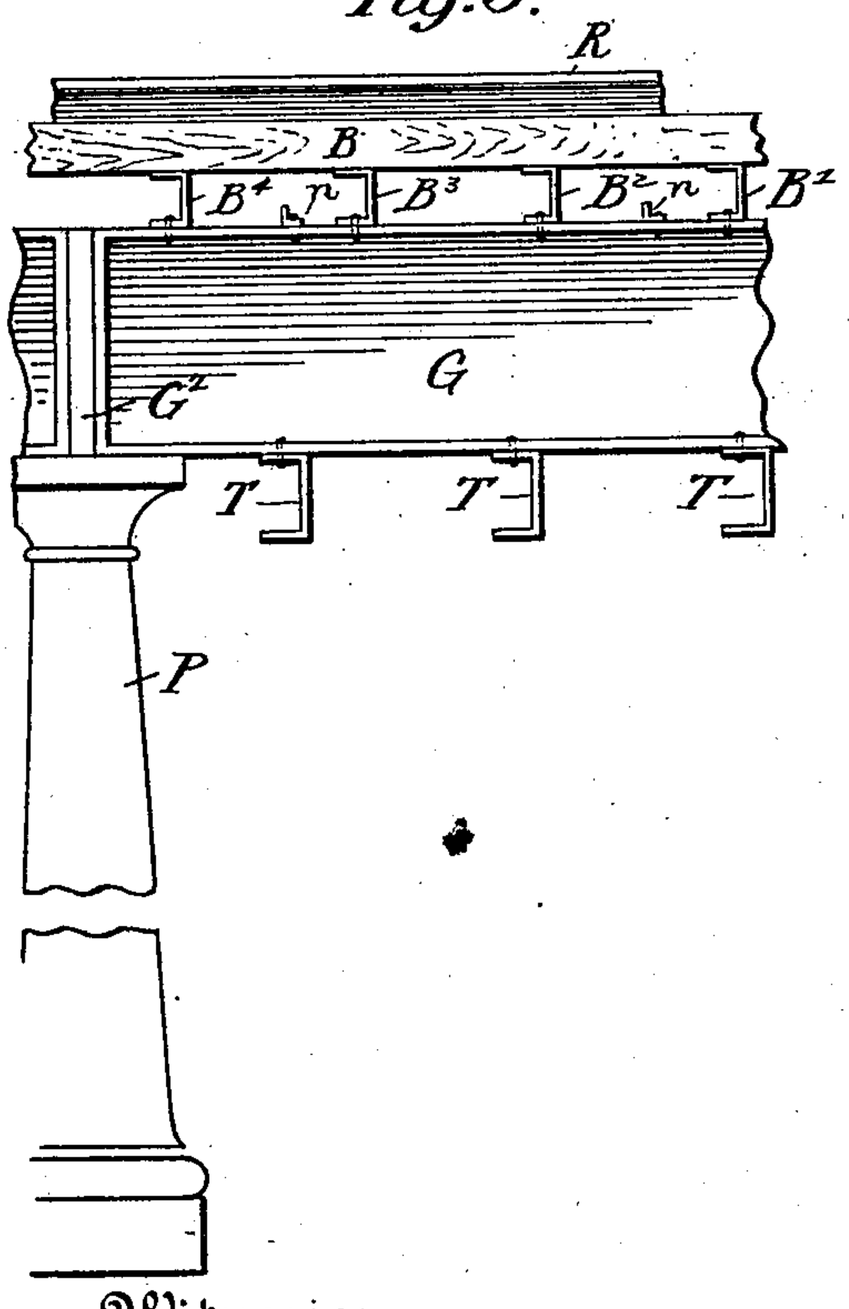


Fig. 3.

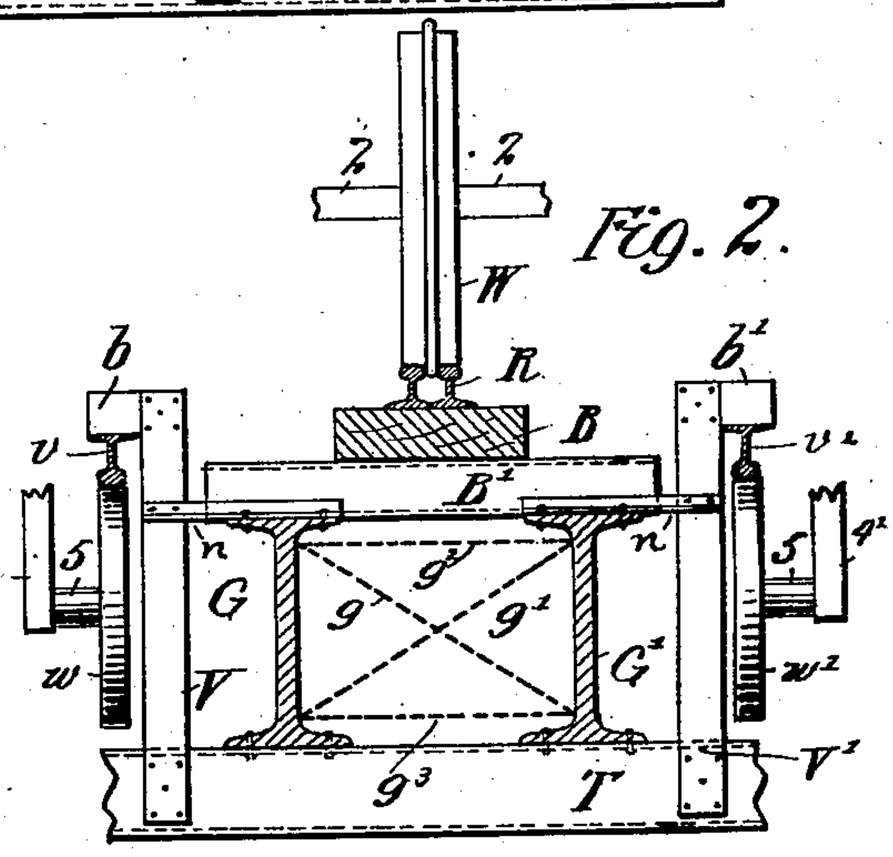


Fig. 2.

Witnesses
Frank S. Ober
Philip C. Keck

George H. Thomson Inventor
By his Attorney Walter H. Edmonds

UNITED STATES PATENT OFFICE.

GEORGE H. THOMSON, OF OSSINING, NEW YORK, ASSIGNOR TO AMERICAN ELEVATED RAILROAD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

ELEVATED-RAILWAY STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 722,773, dated March 17, 1903.

Application filed July 17, 1902. Serial No. 115,926. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. THOMSON, a citizen of the United States, and a resident of Ossining, in the State of New York, have invented certain new and useful Improvements in Elevated-Railway Structures, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a view taken transversely at right angles to the direction in which the structure extends longitudinally or in the direction in which the railway is projected and showing parts in elevation and parts in section, as will be hereinafter more fully described, and also parts of a truck and car-body sufficient to illustrate the functions and application of my said improvements. Fig. 2 is a similar view showing application to a single track. Fig. 3 is a side elevation of certain parts.

My present invention relates to that class of so-called "elevated railways" designed for the passage of trains or carriers at rates of speed so high as to require means for holding down the latter positively as against upward pressures tending toward derailment, such means involving usually and as in the present instance a system of guard-rails and guard or clutch wheels connected with the carrier and upwardly bearing against such guard-rails, the tread of which is presented downwardly to meet them.

The problem involved in my present improvements is in part the organization of a supporting structure for the railway proper and adapted to resist the downward pressures directly caused by the passage of the train or carrier and in combination therewith auxiliary devices adapted to support the said guard-rails and to resist the upward pressures thereon with the least possible and least injurious strain to the main supporting structure.

Heretofore the downwardly-presented guard-rails have been either secured to the under side of cross-ties, being the same ties to the upper surface of which the main upwardly-presented bearing-rails directly supporting the carriers have been secured, or the said downwardly-presented guard-rails have been connected with integral parts of the main supporting structure and in such relation thereto as to transmit upward pressures to the latter, so as to act directly upon upwardly-extending supports and primarily at points considerably distant laterally from the main bearing-rails. Such previous methods have resulted in less stability and economy than are desirable.

My invention consists, therefore, among other things, in devising, organizing, and combining a system of support for the main bearing-rails and a system for the guard-rails such as to insure that the upward pressures brought to bear upon the guard-rails shall be transmitted to the main bearing structure and focused at such point or points as will render them least injurious to the integrity and stability of the main supporting structure and correspondingly so to the maintenance of the proper alinement and function generally of the guard-rails themselves, whereby the integrity, permanence, stability, and strength of the combined structure taken as a whole are preserved and important contribution made to the safety of the train or carrier and its load while traveling at even the highest rates of speed, and particularly upon curves.

My inventions are embodied in the hereinafter-described devices and combination of parts for effecting the purposes described.

G G′ (vertical transverse sections of which are shown in Figs. 1 and 2) are the main girders of the supporting structure or bridge. These extend longitudinally in parallelism with each other and are supported at their ends by abutments or pillars P, Fig. 3, are connected at their ends to similar girders similarly supported and constituting the next span in any convenient manner—as, for instance, G to G^2, as shown in Fig. 3—and may be, if desired, further secured together as against lateral displacement in any convenient manner, as by laterals or braces g g' g^2 g^3, Fig. 2.

The girders G G′ are preferably of rolled steel or a built-up section known as "rivet-girders," of usual design, as shown in the drawings, the depth of the girders being limited by structural considerations involving

the practical location of lateral and vertical sway systems, which latter are unnecessary to be shown for an understanding of the present inventions, and it will be understood that these girders may constitute the upper chords of a deck-truss, if circumstances so require.

The girders G G′ directly support the bearing-rails and the load carried thereby.

B B′ are bearing-blocks, preferably of wood, secured to the top flange of the girders by screw-bolts or in any other convenient manner, upon which are in turn supported, as shown, the bearing-rails R R′, said rails being secured to the blocks in any convenient manner, though preferably by wood-screws and other necessary complements of plates, washers, &c. The rails R R′ are laid with precision as to surface and line and may be preferably provided with angle-joints and in some cases with bearing (tie) plates at the joints. The drawings show the rails R R′ disposed so as to constitute what is substantially a monorail system.

W is one of the bearing-wheels (shown in end elevation) supporting the truck, said wheel being provided with a medial circumferential flange adapted to coact intermediately with the rails, as shown.

1 1′ are string-pieces (shown in vertical transverse section) extending longitudinally of the truck and within which the axle 2 of the wheel W is journaled.

3 is a transom or transverse member of the truck rigidly secured to the string-pieces 1 1′.

4 4′ are links or arms rigidly secured to the transom 3 and carrying journaled within their lower extremities the axles 5 5′ of the guard or clutch wheels *w w′*. Each truck is preferably provided with two bearing-wheels, operating and connected therewith substantially as W aforesaid, and the truck embraces also additional elements and parts which are not shown in the drawings or described here, since it is believed that these are not essential to an understanding of my present inventions, those portions only of the truck being shown and described which are requisite to convey an understanding of the respective and mutual relation of the guard-wheels and bearing-wheels to each other and to the truck and rails.

It will be observed that forces tending to lift the truck off of the bearing-rails R R′ or to disturb its equilibrium in relation thereto will be resisted, as is well understood, provided that the guard-wheels *w w′* are controlled as against upward movement with the requisite power and precision. Means are provided as follows for attaining these results and in such manner as to cause the least strain and disturbance to the supporting structure already described. I provide for this purpose a plurality of underhung guard-rail-bearing frames, as many as may be requisite to secure perfect stability of the guard-rails under varying conditions as presented by each particular case. Each of these frames consists, essentially, of the following members, viz: First, of a transverse horizontal beam T, extending beyond and supported at right angles to the webs of the girders G G′. This beam T is constructed of any suitable or adequate shape and section for the special services required, (the shape shown in the drawings being preferable,) and preferably of rolled or cast steel. Each beam T is strongly and rigidly connected to the bottom flange of the girders G G′. Second, vertical members V V′ V^2 V^3, Figs. 1 and 2. These are likewise preferably constructed of steel of channel or other approved shape and are rigidly secured to the beams T, one pair to each beam, and at right angles thereto and in parallelism with the webs of the girders G G′. Third, horizontally and outwardly extending members or brackets *b b′*, which may be either integral with the uprights V V′ or rigidly secured thereto in any convenient manner. To the under side of these brackets or members *b b′*, suitable provision being made for insulation where electric motive power is employed, are rigidly and with precision secured the guard-rails *v v′*, either directly or to an intervening suitable continuous girder. The guard-wheels *w w′* engage with and bear upwardly against the said inverted guard-rails *v v′*, as shown in the drawings. The uprights V V′ are preferably still further secured as against lateral displacement by stays *n n*, as required. These stays are secured to the top flange of the girder G.

The combination of the beam T, uprights V V′, outwardly and horizontally extending projections or brackets *b b′*, taken as a whole in its location relatively to the girders G G′, and these to the supporting structure of the railway may be, as stated, indefinitely multiplied and secured to such structure at as many points as required and without regard to its position in relation to the verticals or other supports, piers, or pillars of such structure. It will be observed that the arrangement of the parts and their combination together for the purposes specified results in transferring the entire upward pressure or strain transmitted through the guard-wheels directly to points directly beneath the girders G G′ and avoids all direct strain upon any other part of the supporting structure, and it will be further observed that at the moment at which this upward strain referred to is exerted the girders G G′ are carrying in substantially the same plane transverse of the railway the entire weight of the train or carrier, the downward pressure or weight of the latter thus being caused to directly and simultaneously counterbalance the upward pressures developed upon the structure through the guard-rails.

It will be apparent that the horizontally-extending members or brackets *b b′* might be disposed so as to extend inwardly instead of outwardly relatively to the uprights V V′ V^2 V^3.

Fig. 1 shows my invention applied to an elevated-railway structure adapted to support a double line of monorail-ways. The girders G G′ and the bearing-blocks B B′ are the only elements of the supporting structure shown in the figure referred to, it being understood that the girders may be supported in any preferred manner—as, for instance, (indicated in Fig. 3,) by suitable pillars P. Fig. 2 shows the application of my invention to a single track of the same railway, and in this instance it will be observed that I support the bearing-blocks B upon a plurality of transversely-disposed cross-beams B′ B^2 B^3 B^4. (Shown in section in Fig. 3.) These beams B′ B^2, &c., are rigidly secured in any convenient manner to the tops of the girders G G′, and to them in turn is secured the bearing-blocks B, or in lieu of bearing-blocks B a continuous longitudinally-extending beam or string-piece may be employed, as shown in Fig. 3.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is the following, viz:

1. In combination with an elevated-railway structure comprising horizontally and longitudinally disposed supporting-girders, a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member secured to and underlying the girders, vertically-disposed members secured to said transverse member, and horizontally-disposed members secured to each of said vertically-disposed members above their point of union with said transverse member, substantially as and for the purposes described.

2. In combination with an elevated-railway structure comprising horizontally and longitudinally disposed supporting-girders G G′ a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member T secured to and underlying the girders, vertically-disposed members V V′ V^2 V^3 secured to said transverse member, and horizontally-disposed members *b b′* secured to each of said vertically-disposed members above their point of union with the said transverse member, substantially as and for the purposes described.

3. In combination an elevated-railway structure comprising horizontally and longitudinally disposed girders supporting bearing-rails having their treads upwardly presented, a truck comprising wheels downwardly bearing upon said rails and upwardly-bearing guard-wheels, guard-rails having their treads downwardly presented and coacting with said guard-wheels and a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member T secured to and underlying the girders, vertically-disposed members V V′ V^2 V^3 secured to said transverse member, and horizontally-disposed members *b b′* secured to each of said vertically-disposed members above their point of union with the said transverse member, substantially as and for the purposes described.

4. In combination with an elevated-railway structure comprising horizontally and longitudinally disposed supporting-girders, a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member secured to and underlying the girders, vertically-disposed members secured to said transverse member, and horizontally-disposed and outwardly-projected members secured to each of said vertically-disposed members above their point of union with said transverse member, substantially as and for the purposes described.

5. In combination an elevated-railway structure comprising horizontally and longitudinally disposed girders supporting bearing-rails having their treads upwardly presented, a truck comprising wheels downwardly bearing upon said rails and upwardly-bearing guard-wheels, guard-rails having their treads downwardly presented and coacting with said guard-wheels and a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member T secured to and underlying the girders, vertically-disposed members V V′ V^2 V^3 secured to said transverse member, and horizontally-disposed and outwardly-projected members *b b′* secured to each of said vertically-disposed members above their point of union with the said transverse member, substantially as and for the purposes described.

6. In combination with an elevated-railway structure comprising horizontally and longitudinally disposed supporting-girders, a plurality of underhung guard-rail-bearing frames each comprising a horizontally-disposed transverse member secured to and underlying the girders, vertically-disposed members secured to said transverse member, horizontally-disposed guard-rail-bearing members secured to each of said vertically-disposed members above their point of union with said transverse member, and stays connecting the vertically-disposed members with said girders.

GEORGE H. THOMSON.

Witnesses:
WALTER D. EDMONDS,
GEORGE G. MEASURES.