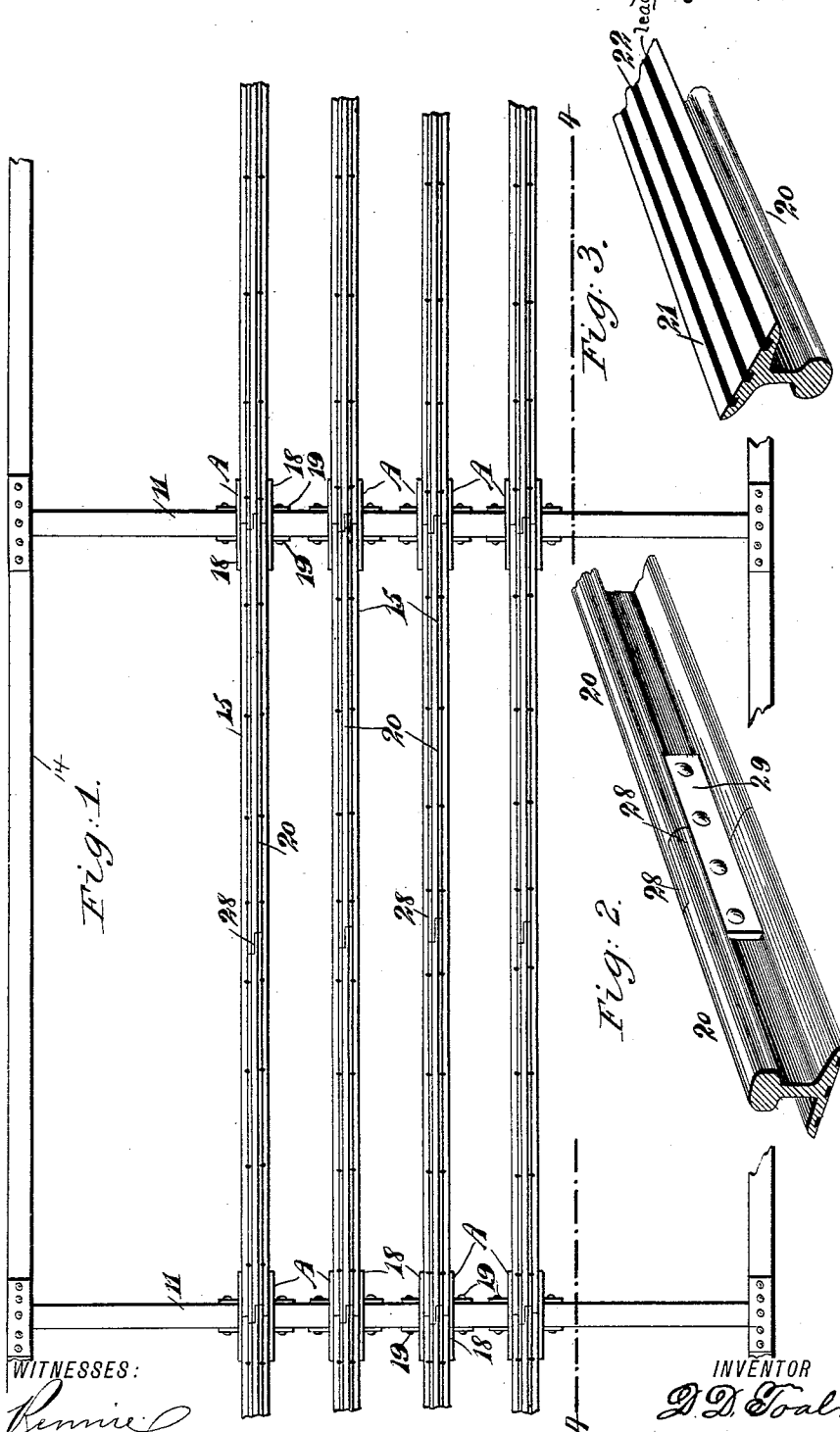


D. D. TOAL.
ELEVATED RAILWAY STRUCTURE.

No. 564,854.

Patented July 28, 1896.



WITNESSES:
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(No Model.)

2 Sheets—Sheet 2.

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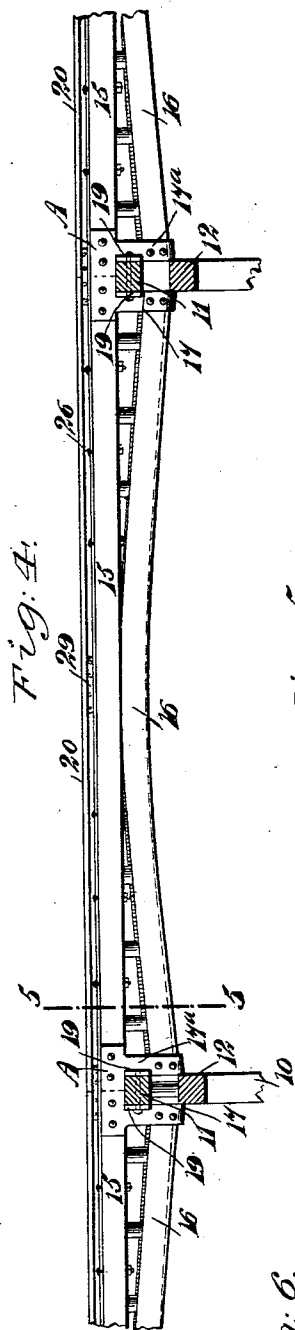


Fig. 4.

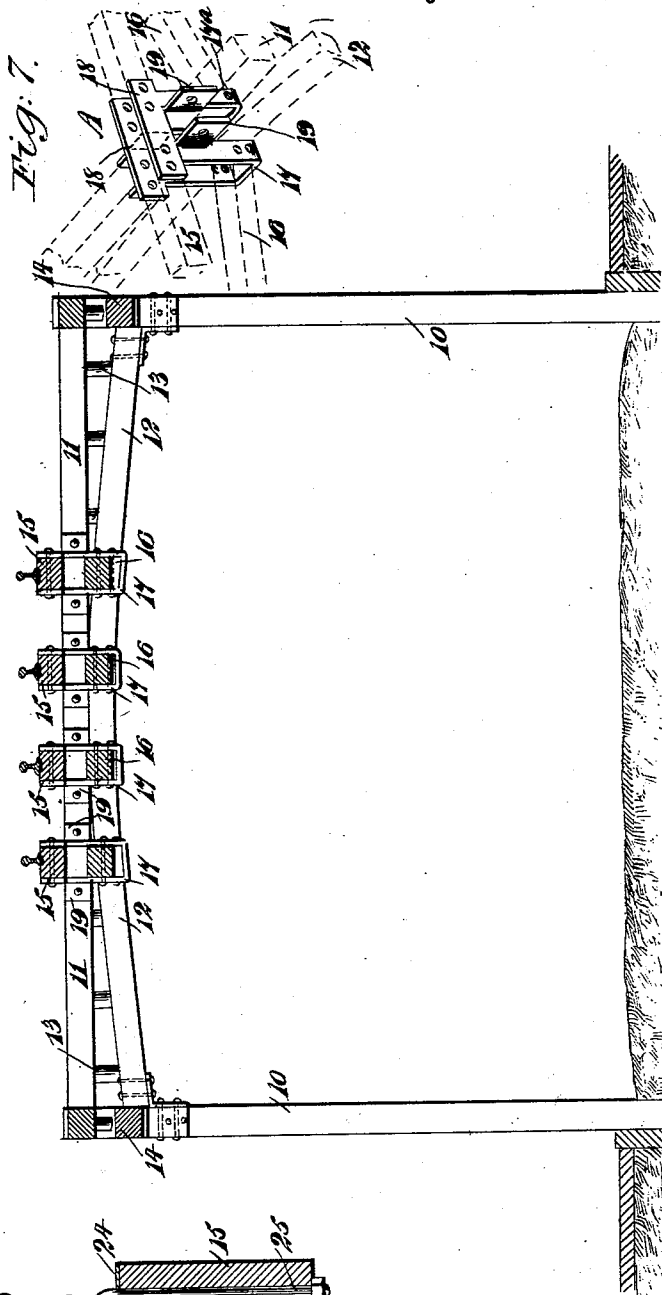


Fig. 7.

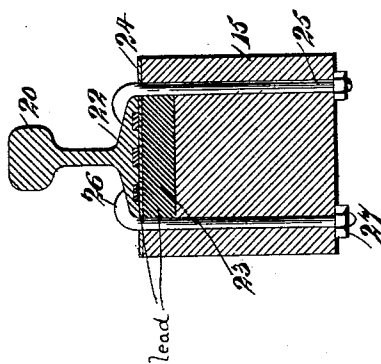


Fig. 6.

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UNITED STATES PATENT OFFICE.

DAVID D. TOAL, OF NEW YORK, N. Y.

ELEVATED-RAILWAY STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 564,854, dated July 28, 1896.

Application filed February 20, 1896. Serial No. 580,110. (No model.)

To all whom it may concern:

Be it known that I, DAVID D. TOAL, of New York city, in the county and State of New York, have invented a new and useful Improvement in Elevated-Railway Structures, of which the following is a full, clear, and exact description.

My invention relates to an improvement in elevated-railway structures, and has for its object to combine lightness of structure with strength, and to provide a series of arches instead of straight supports, and, furthermore, to so construct the elevated structure that the light of stores and dwellings will not be interfered with to any damageable extent, and whereby, further, the amount of space required for the uprights can be taken from the curbstone of the gutter on the line of the street without loss of space to traffic.

Another object of the invention is to provide a means for doing away with all surface cars and the danger arising therefrom by erecting a structure capable of supporting a number of tracks, so that the streets over which the structure is located will be as free for the business of trucks and conveyances of all kinds as though the structure did not exist. It is furthermore claimed for the improvement that a series of bolts may be employed as fastenings for the rails in lieu of the spikes heretofore required.

Another object of the invention, and one of the main features of said invention, is to provide for the deadening of sound by laying the rails upon a lead bed, and providing the rails with a lead cushion in their under flanged surfaces, the said cushions being virtually an integral portion of the said rails, and likewise whereby the bottom portion of the car may also be covered or provided with a lead casing, which will serve to deaden all obnoxious sounds. It is further claimed that where the rails are heavy and fastened by my system of bolts, and where the car is leaded on the bottom, but very little sound will be produced by the cars passing over the rails. It is further claimed that the cars may be run over the center of the street without being obnoxious to the residents along the line of the road, and that any speed can be attained without danger to pedestrians, and that the public may be conveyed safely and

speedily to and from any portion of the city, steam, electricity, cable, or other power being adapted for use on the structure to advantage. It is further claimed that the foundations will not require the depth of the present elevated structures, and that where the soil is soft piles driven into the same will be sufficient for the support of the foundations, and therefore the cost of constructing the road will be materially lessened over the present system.

A further object of the invention is to provide a means whereby the strain incident to elevated structures will be more equally divided than heretofore.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a portion of the improved elevated structure. Fig. 2 is a perspective view of the meeting ends of two rails adapted for the structure, illustrating the manner in which the rails are connected. Fig. 3 is a perspective view of a portion of one of the rails, viewed from the bottom, and illustrating the application of the lead cushion thereto. Fig. 4 is a vertical section taken substantially on the line 4 4 of Fig. 1. Fig. 5 is a vertical transverse section taken substantially on the line 5 5 of Fig. 4. Fig. 6 is a section through one of the rails and the sleeper or beam adapted for the support of the same, illustrating the fastening devices employed for securing the rail to its bed; and Fig. 7 is a detail perspective view of the supporting device for sundry of the arched supporting-beams of the structure.

In carrying out the invention a suitable number of uprights 10 are provided, which are located as close as possible to the curbing of the street, as shown in Fig. 5. Each pair of transversely-aligning uprights is connected by a preferably straight tie-beam 11, and each tie-beam 11 is supported by an arch-beam 12, which is secured in any suitable or approved manner to the uprights between which it is located, as shown in Fig. 5, and the arch-

beams 12 are usually connected with the tie-beams 11 above them by means of bolts 13, thimbles, or their equivalents. Longitudinal arch-beams 14 are made to connect adjacent longitudinally-alining uprights 10, so as to provide a thoroughly braced and trussed structure.

The sleepers or track-beams 15 may be, and preferably are, laid longitudinally of the structure upon the tie-beams 11, and any number of track-beams may be employed, in the drawings two of the said beams being illustrated at each side of the transverse center of the structure. The sleepers or track-beams 15 are preferably interlocked at their meeting ends, as shown in Fig. 1, although they may be otherwise connected, and each sleeper or track-beam is braced and supported by a longitudinal arch-beam 16.

In Fig. 7 I have illustrated a device A for tying and supporting the ends of the longitudinal arch-beams 16, the said device consisting of two stirrups 17 and 17^a, the members whereof are connected at the top by plates 18, and flanges 19 are projected laterally from the sides of the stirrups, being at a right angle to the top of the connecting-plates 18. A sleeper or track-beam 15 is received between the upper connecting-plates 18 of the stirrups, being bolted or otherwise secured to the said sleeper, and the end of one of the longitudinal arch-beams 16 is received in one stirrup—the stirrup 17, for example—and is bolted thereto, while the abutting end of the opposing longitudinal arch-beam 16 is received in the other stirrup, 17^a, as shown in dotted lines in Fig. 7, while the transverse or tie beams 11 and the transverse arch-beams 12 are passed between the stirrups, as is also shown in dotted lines in Fig. 7.

The truss formation of the framework of the structure adds materially to its strength and permits said structure to be made much lighter than usual.

The rails 20 are laid longitudinally upon the sleepers or track-beams 15, and in the bottom face of each rail one or more longitudinal grooves 21 are produced, and these grooves are provided with a filling 22, of lead or an equivalent material, and that portion of the track-beam or sleeper beneath the flange of the rail is longitudinally recessed to receive a bed 23, of lead or an equivalent material, and preferably the entire upper face of each sleeper or track-beam is covered by a sheet 24 of dead metal.

Instead of the usual spikes, bolts 25 are employed for attaching the rails to the track-beams or sleepers 15, as shown in Fig. 6. These bolts are provided with spike-like heads 26, which engage with the flanges of the rails, and their lower ends, which are threaded and extend through beyond the bottom of the sleepers or track-beams, are provided with nuts 27 or like fastening devices. The abutting ends of the rails 20 are made with inter-

locking ends or tongues 28, as shown in Fig. 2, and fish-plates 29 may be and preferably are secured to each side of the joint, whereby the rails will be held snugly together, and the wheels of the vehicle may pass rapidly from one section of the rail to another with a minimum of friction. By placing the rails upon the lead bed in the manner heretofore described, all jar and noise are obviated, especially when a lead bed is likewise applied to the bottom of the car or other vehicle traveling over the track.

There is an entire abolition of wood, since all the parts are of metal. The arch-beams will take up expansion and contraction much better than a straight surface, and all wooden ties or sleepers are done away with, since even the sleepers or track-beams are of metal.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In the construction of railways, rails having longitudinal grooves in their bottom faces, and a filling of dead metal such as lead, arranged in each of the said grooves flush with the lower face of the rail and forming cushions for the said rail, as and for the purpose specified.

2. In elevated-railway structures, the combination, with uprights, tie-beams connecting transversely-alining uprights, arch-beams supporting the tie-beams, sleepers or track-beams secured upon the tie-beams, extending longitudinally of the structure, and longitudinal arch-beams supporting the sleepers or track-beams, as and for the purpose specified.

3. In an elevated-railway structure, the combination with uprights, of straight tie-beams connecting each pair of transversely-alined uprights, transverse arch-beams secured to the uprights and to the tie-beams, longitudinal track-beams on the tie-rails and longitudinal arch-beams secured to the track-beams, substantially as described.

4. In an elevated-railway structure, the combination with uprights, of straight tie-beams connecting each pair of transversely-alined uprights, transverse arch-beams secured to the uprights and to the tie-beams, arch-beams connecting adjacent longitudinally-alined uprights, track-beams on the tie-beams, and a longitudinal arch-beam secured to each track-beam, substantially as described.

5. In elevated-railroad structures, the combination, with uprights, and tie-beams connecting transversely-alining uprights, of arch-beams supporting the tie-beams, sleepers or track-beams secured upon the tie-beams, extending longitudinally of the structure, longitudinal arch-beams supporting the sleepers or track-beams, and stirrups in which the ends of the longitudinal beams are secured, the said stirrups being attached to the track-beams above the arch-beams which they support, as and for the purpose specified.

6. In elevated-railway structures, the combination, with uprights and tie-beams connecting transversely-aligning uprights, of arch-beams supporting the tie-beams, sleepers or
5 track-beams secured upon the tie-beams, extending longitudinally of the structure, longitudinal arch-beams supporting the sleepers or track-beams, stirrups in which the ends of the longitudinal beams are secured, the said
10 stirrups being attached to the track-beams above the arch-beams which they support, and flanges attached to the stirrups, adapted

for engagement with and attachment to the tie-beams, as and for the purpose set forth.

7. In the construction of railways, a track-
15 beam or sleeper provided with a leaden bed, and a rail located upon the said leaden bed, having its under face cushioned with a like metallic substance, arranged in grooves therein as and for the purpose specified.

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Witnesses:

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A. A. HOPKINS.