

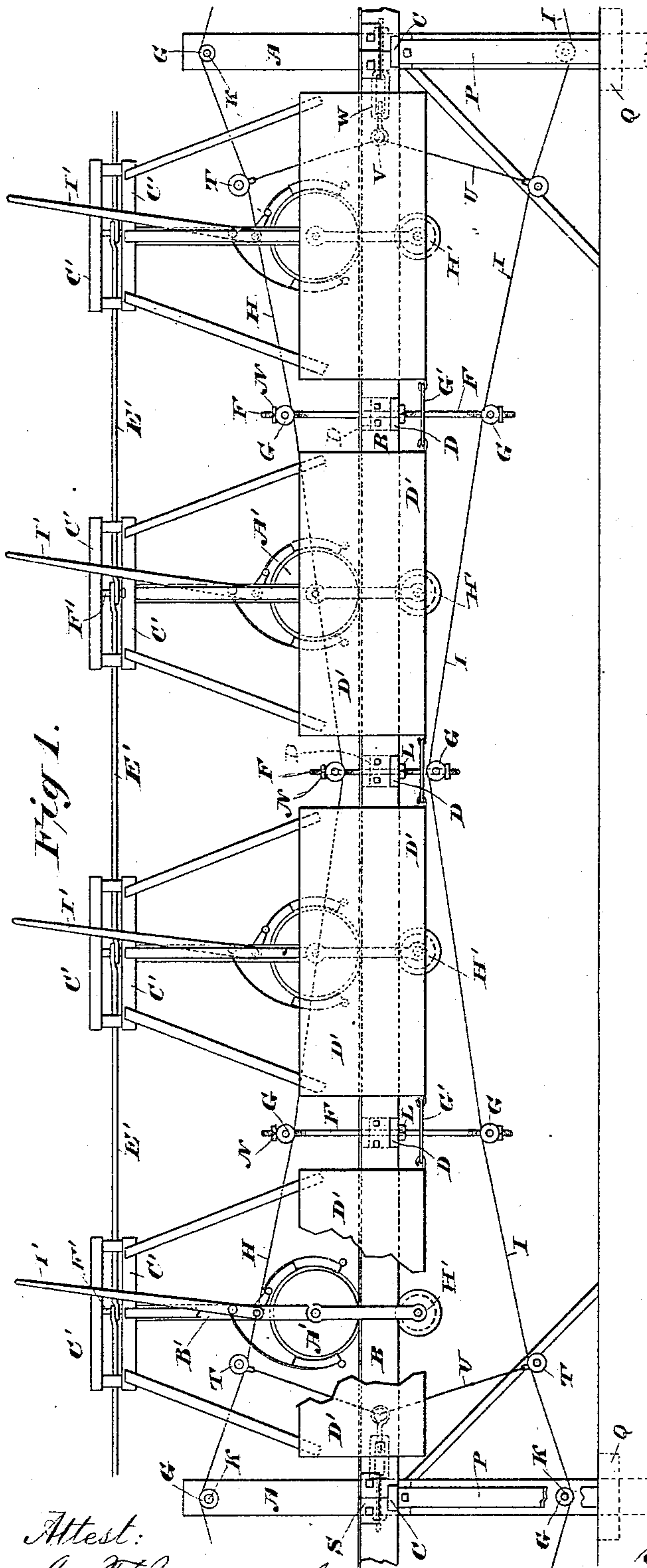
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C. J. QUETIL.  
ELEVATED TRAMWAY, &c.

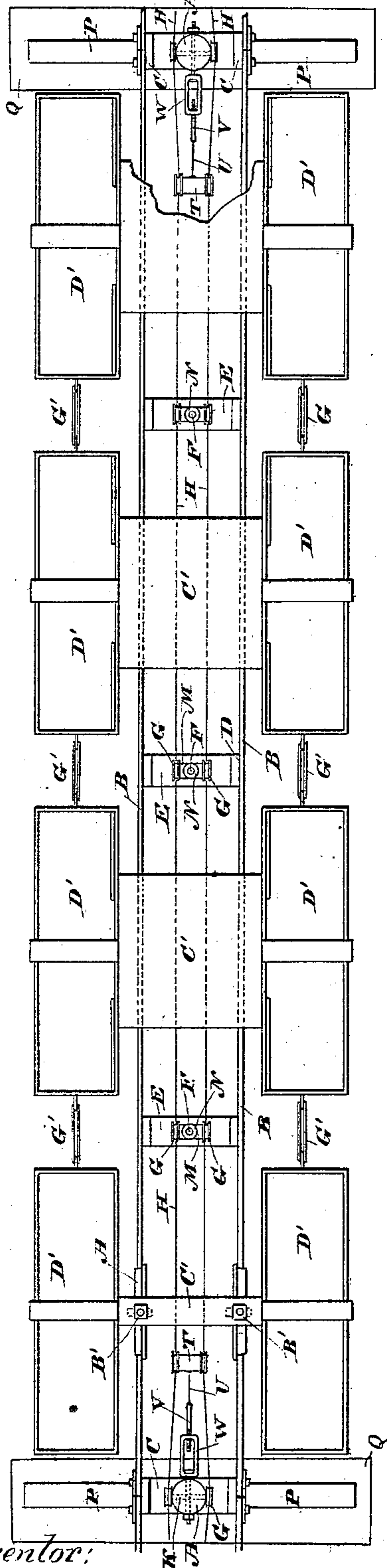
No. 278,819.

Patented June 5, 1883.



Attest:  
Geo. T. Smallwood Jr  
Philip Mann

Fig 2.



Inventor:  
Charles J. Quetil  
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A. Pollok his atty.

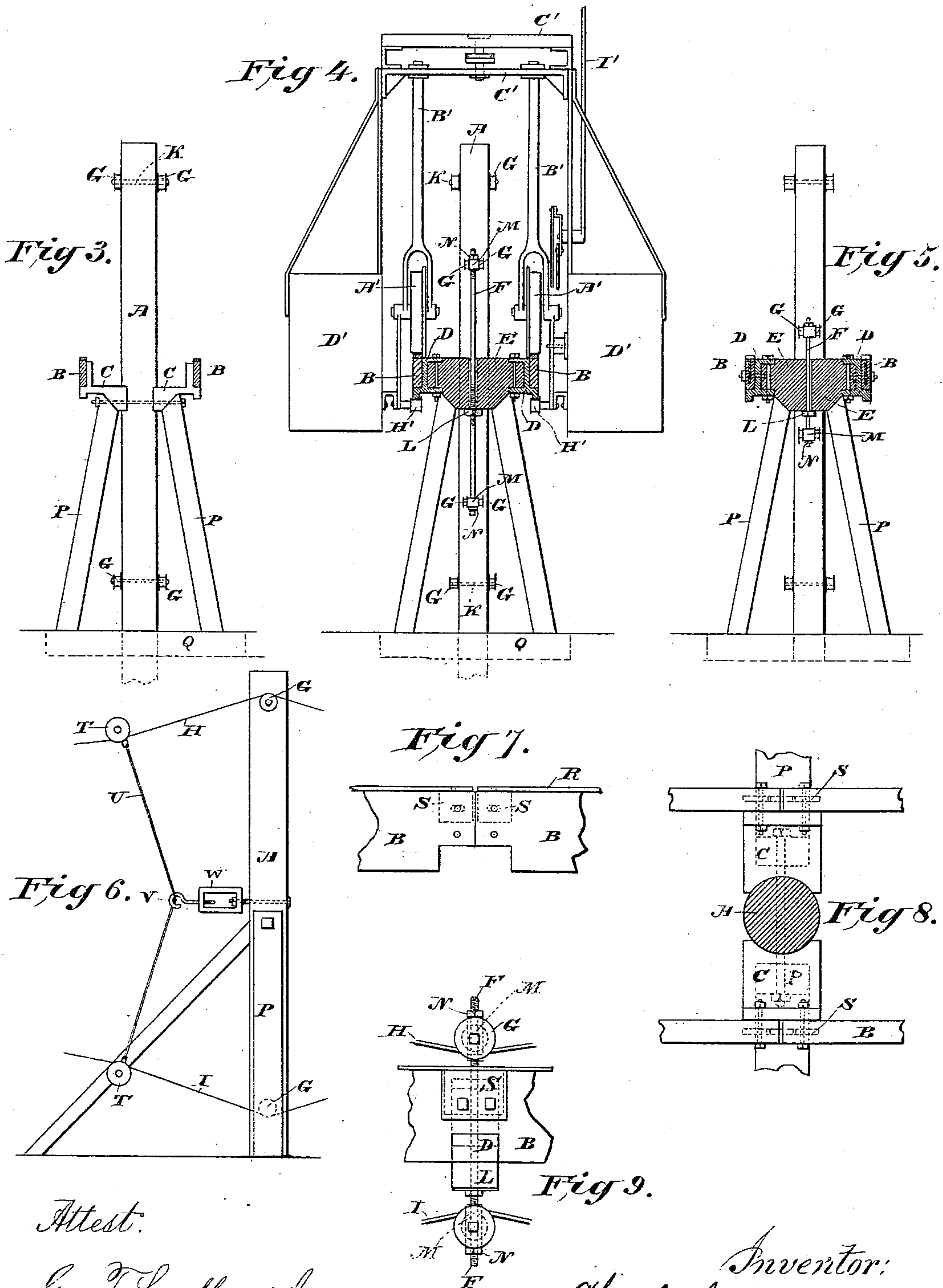
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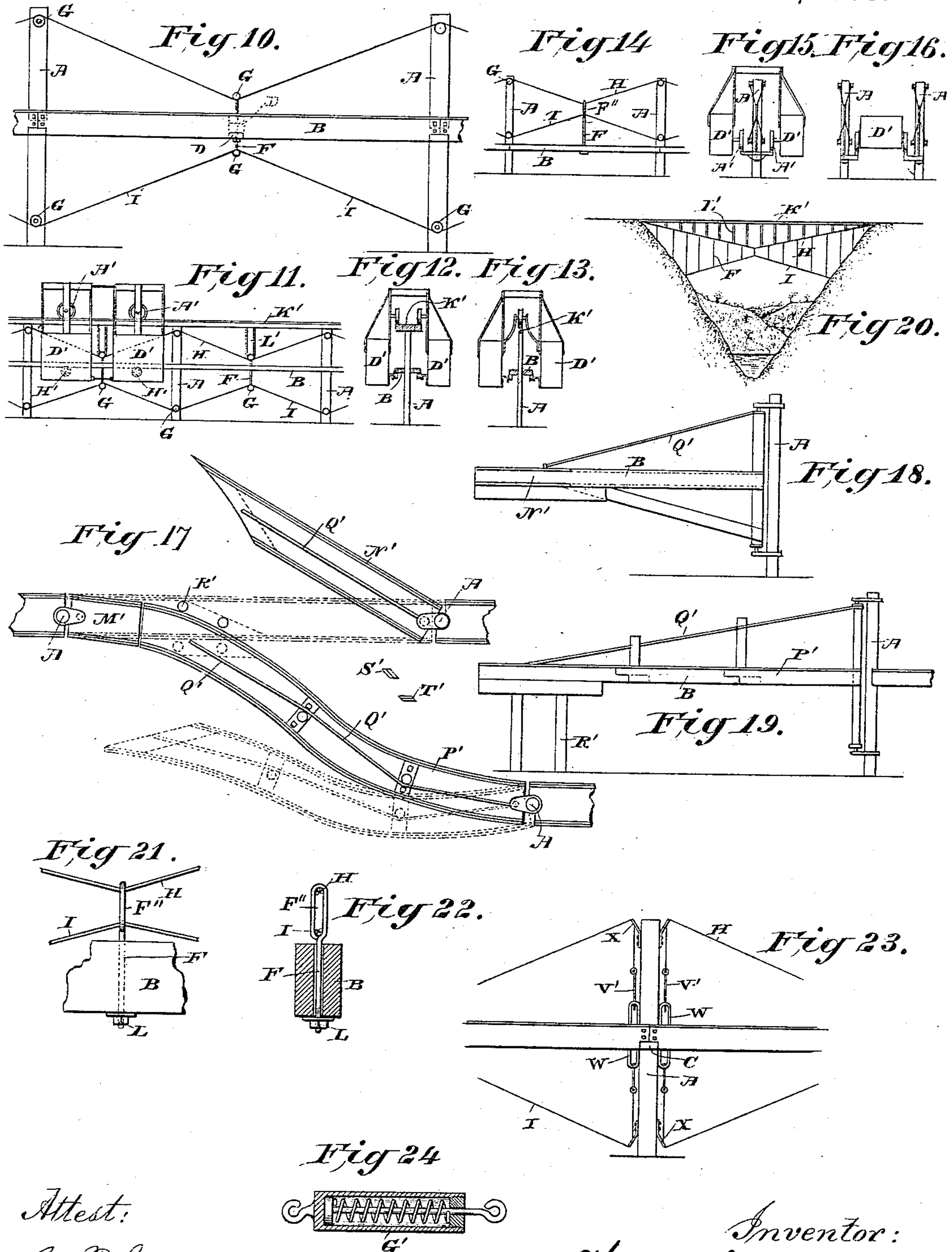
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Patented June 5, 1883.



Attest:  
Geo. T. Smallwood Jr  
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By *[Signature]*  
his atty.



# UNITED STATES PATENT OFFICE.

CHARLES J. QUETIL, OF ALBUQUERQUE, TERRITORY OF NEW MEXICO.

## ELEVATED TRAMWAY, &c.

SPECIFICATION forming part of Letters Patent No. 278,819, dated June 5, 1883.

Application filed January 30, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES J. QUETIL, of Albuquerque, in the county of Bernalillo and Territory of New Mexico, have invented a new and useful Improvement in Elevated Tramways or other Structures, which improvement is fully set forth in the following specification.

This invention has reference more particularly to a tramway supported on posts, in which the rails, sills, or supports for the rails are supported between the posts by wires or wire rope; but it contemplates, also, the application of the new principles or devices to bridges and other raised structures.

It consists, first, in a new system of wire braces comprising two wires or sets of wires, an upper and a lower one. The upper wire or set of wires is for suspending the track or bed of the structure, the lower set for bracing the upper and keeping them rigid. The two sets are connected with each other, and are combined with tightening devices for taking up the slack and stretching the wires, so that the system will, notwithstanding the flexible nature of the wire, be rigid, or practically so.

The invention further comprises certain special constructions and arrangements of tightening devices for connecting the rails or bed of the structure with the wires, of the supports for the rails or bed and the wires, and of the different parts making up the structure, and also the new construction of the cars or wagons for traveling on the tramway or railway.

In the accompanying drawings, which form a part of this specification, Figures 1 and 2 are, respectively, an elevation and plan of a single span of elevated tramway constructed in accordance with the invention, a number of wagons or tramway-cars being shown on the track. Figs. 3, 4, and 5 are views in sectional elevation, the sections being in vertical planes transverse to the direction of the tramway. Figs. 6, 7, 8, and 9 are detail views; Fig. 10, an elevation showing a shorter span than represented in Figs. 1 and 2; Figs. 11 to 16, views representing modified constructions; Figs. 17 to 19, views in plan and elevation, respectively, illustrating a form of switch employed; Fig. 20, an elevation of a span crossing a ravine, and Figs. 21 to 24 detail views.

The posts A, set a suitable distance apart, uphold the ends of longitudinal beams or rails B, by means of castings C, which are bolted to said posts, at a suitable distance below the upper ends thereof. Between the posts the beams or rails B are bolted to castings D, which in turn are bolted to blocks or cross-pieces E. With the blocks or cross-pieces E are connected the suspension-rods F. Near the top and bottom of each post A, and at each end of each suspension-rod F, are pulleys, washers, or similar devices, G. The upper suspension-wires, H, are passed over the pulleys or washers near the top of the posts, and under those on the upper ends of the suspension-rods, so that through said rods and the blocks or cross-pieces E they sustain the beams or rails B between the posts. The lower bracing-wires, I, are passed under the pulleys or washers at the bottom of the posts and over those at the lower end of the suspension-rods. The two sets of wires being stretched, the top wires, H, whose section conforms to the tension which it is calculated will be put upon them, are or may be so braced by the bottom wires, I, that the weight put upon them will cause no deflection therein, or in the beams or rails supported by them. The span is thus able to bear considerably more weight than would be practicable were deflection not prevented by the rigidity of the wires.

The pulleys or washers are secured to the posts A by bolts K through the post; or they may be secured thereto in other suitable ways.

Eyes or hooks through which the wires pass could be used instead of pulleys or washers.

The suspension-rods F pass through the blocks or cross-pieces E, and, being screw-threaded, have each a nut, L, and washer, upon which the corresponding block or cross-piece rests. The pulleys or washers on each suspension-rod are supported by sleeves M, encircling the suspension-rods, and held in place by nuts N on said rods. The nuts L N, being adjustable, serve to tighten the wires and to secure the blocks or cross-pieces at the proper height. In order to brace the track or bed formed of the beams or rails C and cross-pieces E against lateral strains, the pulleys or washers on the suspension-rods are separated by a less dis-



tance than those on the posts, so that the wires run obliquely between the posts and the suspension-rods, as shown in Fig. 2.

The shape of the castings D is clearly shown in Figs. 4, 5, and 9. They have each inner flanges, through which pass the bolt or bolts that secure them to the cross-pieces, a vertical web to which the beam or rail B is bolted, an outside flange upon which the said beam or rail rests, and a depending lip on the bottom of said outside flange. The bottom of the beam or rail is cut away to receive the outside flange, and the under surface of the depending lip is on a level with that of the beam or rail. This is considered the best means for connecting the beams or rails with the cross-pieces E; but other means could be used instead, if desired.

To steady the posts A against lateral movement the inclined braces P are placed on either side of each of them, the lower ends of said inclined braces resting upon a board or plate, Q, which wholly or partly surrounds the post. Their upper ends fit in sockets on the under side of the castings C, and are held in place by bolts, which pass through them, through the inner ends of the castings C, and also through the post. The castings C, like those marked D, have a vertical web to which the rails or beams B are bolted, an outside flange on which they rest, and a depending lip under said flange. (See Figs. 3 and 8.)

The beams or rails B are ordinarily made of wood faced with a strip, R, of iron or steel. When the rails or beams are bolted to the castings C D plates S, screwed fast to the strips R, are let into the beams or rails. The bolts pass through slots in the plates. The spans ordinarily require only one suspension-rod between the posts, as shown in Fig. 10, they being, say, ten feet in length; but sometimes longer spans will, from the nature of the ground, be required, or will, for other reasons, be desirable, and the number may be increased. Thus in Figs. 1 and 2 the span is supposed to be double the usual length, and three suspension-bars of different length are shown. The necessity of grading is avoided by making the posts A of different heights, according to the nature of the ground. The connection of the pulleys or washers with the cross-pieces by screws and nuts gives, as explained, the means of tightening the wires; but additional or substitute means may be employed. Thus in Figs. 1, 2 and 6, there are at each pole devices T, connected by wires U, which in the middle are held by a screw-hook, V, itself connected with a swivel, W, bolted to the post A. The devices T bear upon the suspension and bracing wires H I, and by drawing them toward the post by turning the swivel W they press the two sets of wires together and stretch them. In Fig. 23 the wires H I pass through eyes X on the post and are connected with screw-eyes V' at opposite ends of the swivels W. These tightening devices would not or need not be used except at considerable intervals. The wires H I are prefer-

ably unannealed, as these have greater strength than annealed wires. At the end of a section of track, or as often as desired, the wires are anchored.

The cars or wagons to be used on these tramways are or may be constructed as shown in Figs. 1, 2, and 4. The wheels A', which run upon the beams or rails, are independently journaled, and are carried at the lower ends of rods B', which are connected together in pairs at their upper ends by the cross-bars C'. The length of the rods B' is such that the said cross-bars C' will pass over the tops of the posts A.

To the cross-pieces are attached pouches or freight-receptacles D', which hang outside the rails and below the wheels A', so as to bring the center of gravity below the point of support, and thus to increase the stability of the cars or wagons. The cross-bars are connected together (two or more) by links or reaches E' and pins F' (omitted from Fig. 2,) passing through holes in the ends of the links. The pouches or receptacles D' on the same side of the track are or may be connected by links G'. These links should be extensible in order to allow the wagons or cars to pass around curves. They may be of rubber, or comprise a spring-piston and cylindrical case, as shown in Fig. 24.

Below the track are double-flanged safety-wheels H', the flanges being a sufficient distance apart to receive the lower edge of the beam or rail between them, while allowing a slight play, and of sufficient depth always to project above the bottom of said beam or rail. The under side of the rail or beam may be protected by metal. Brakes are provided for controlling the movement of the train. They would ordinarily be operated by brakemen riding on the cross-bars C', through the brake-rods I'.

Two or more of these brake-rods may be connected by a rope or chain, so as to be operated together, and a windlass may be employed to operate them. Instead of having the cars or wagons run on the beams or rails B between the suspension-wires H and the bracing-wires I, an additional track, K', may be run over the tops of the posts, the same being supported between the posts by struts L', resting directly upon the suspension-wires H, as shown in Fig. 13, or indirectly.

The track K' may be double, as shown in Fig. 12, or single, as in Fig. 13. It is not necessary, although advantageous, to use the beams or rails B.

Instead of having the track suspended between the suspension and bracing wires, or above them, it may be suspended below them. This arrangement is illustrated in Figs. 14, 15, 16, 21, and 22. The suspension-rods have an eye or loop, F'', at the top, through which the two sets of wires pass. In Fig. 16 there are two sets of posts, each supporting one rail of the track. Of course, instead of a track a foot-walk or bed of any desired kind could be laid.



In case the track or road crosses a ravine too broad to be crossed by the ordinary spans, the construction shown in Fig. 20 is preferably adopted. In this case the two sets of wires are firmly anchored in masonry on each side of the ravine. They are connected by a series of suspension-rods, and the bed or track is supported by struts L'.

The road or tramway may be single or double track. When a switch or turn-out is required it can be made as shown in Figs. 17 to 19. The main line has two movable or swinging sections, M' N', and the side track has a swinging section P'. The sections are each pivoted to one of the posts A. They can be placed in the position shown in full lines, or in that shown in dotted lines, Fig. 17. When section N' is in the position shown in dotted lines the space between it and section M' at the lower part of the figure is filled by a movable piece of track, similar to that represented by T'. This movable track renders the lower rail continuous, the upper being rendered so by the close approach of the two sections. When the section P' is in the position shown in full lines the space in the upper rail is filled by a piece of movable track, similar to that shown at S'. Thus either the main track or the side track may be made continuous, as desired. When the swinging sections N' P' are open they are upheld by iron rods Q'. When closed their ends rest upon the posts R'.

Having now fully described my said invention and the manner of carrying the same into effect, I claim—

1. An elevated tramway or other structure, comprising, in combination, the bed or track, the suspension-wires, the suspension-rods, the bracing-wires, and the posts or anchorage for said wires, said bracing-wires being connected with the suspension-wires between the posts, and serving to keep them rigid by downward or transverse strains, substantially as described.

2. The combination, with the suspension-wires, bracing-wires, and suspension-rods, of tightening means, substantially as described.

3. The combination, with the bed or track, the suspension-wires, the bracing-wires, and the suspension-rods, of the means for making

an adjustable connection between the bed or track and the suspension-rods, substantially as described.

4. The combination of the suspension and bracing wires, the suspension-rods, and the adjustable connection between the wires and suspension-rods, substantially as described.

5. The combination of the suspension-wires, suspension-rods, and bracing-wires with tightening means independent of the connection between the wires and rods, substantially as described.

6. The combination of the posts, beams, rails, cross-pieces, suspension-rods, and suspension and bracing wires, substantially as described.

7. The casting for fastening the rails or beams to the posts, of the form substantially as described, the same comprising an attaching-flange and a seat for the beam or rail, formed by a vertical web and outside horizontal flange.

8. The castings fastening the beams or rails to the cross-pieces, the same having inner flanges, a vertical web, and an outside flange, in combination with said beams or rails and said cross-pieces, substantially as described.

9. The combination of the posts, beams, or rails, cross-pieces, castings, and suspension-rods for supporting the cross-pieces, substantially as described.

10. In combination with a track having rails supported on each side of posts at a distance from the top, cars or wagons having the wheels attached to the lower ends of rods, whereof the upper ends are connected by cross-bars at such height as to clear the tops of the posts, substantially as described.

11. Cars or wagons of the special construction described, the same having the supporting-wheels on each side carried by separate axles, and being provided with elevated reaches and cross-bars, so that posts may pass under said reaches and cross-bars between the wheels, as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CH. J. QUETIL.

Witnesses:

MARIANO ARINYO,  
O. C. CHRISTIAN.