

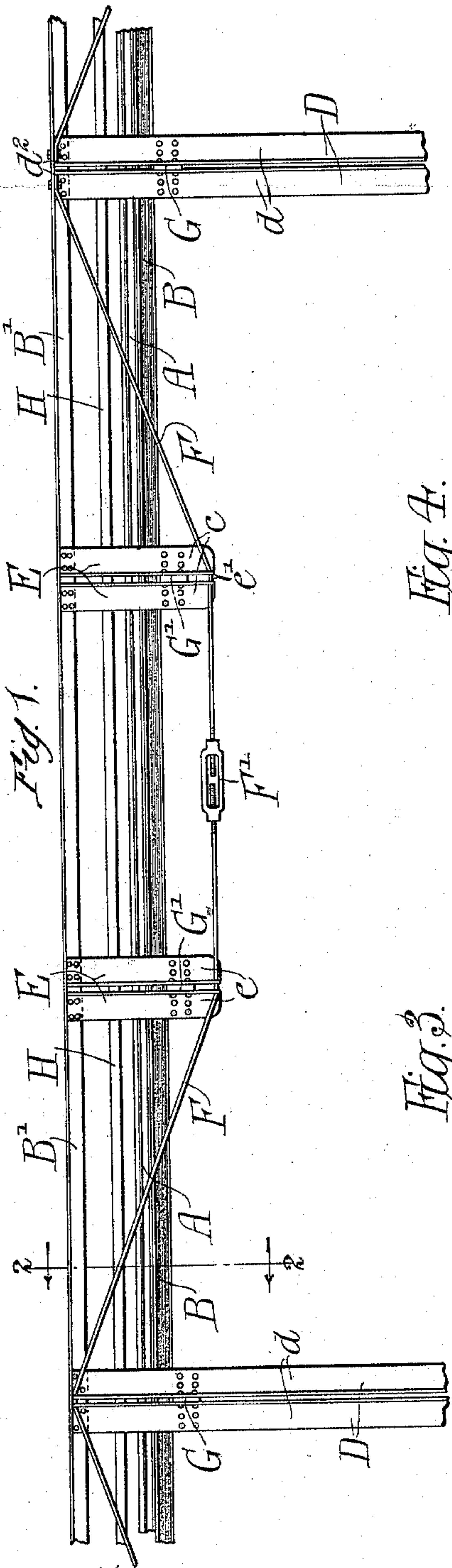
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3 Sheets—Sheet 1.

C. C. BURTON.  
ELEVATED RAILWAY.

No. 518,564.

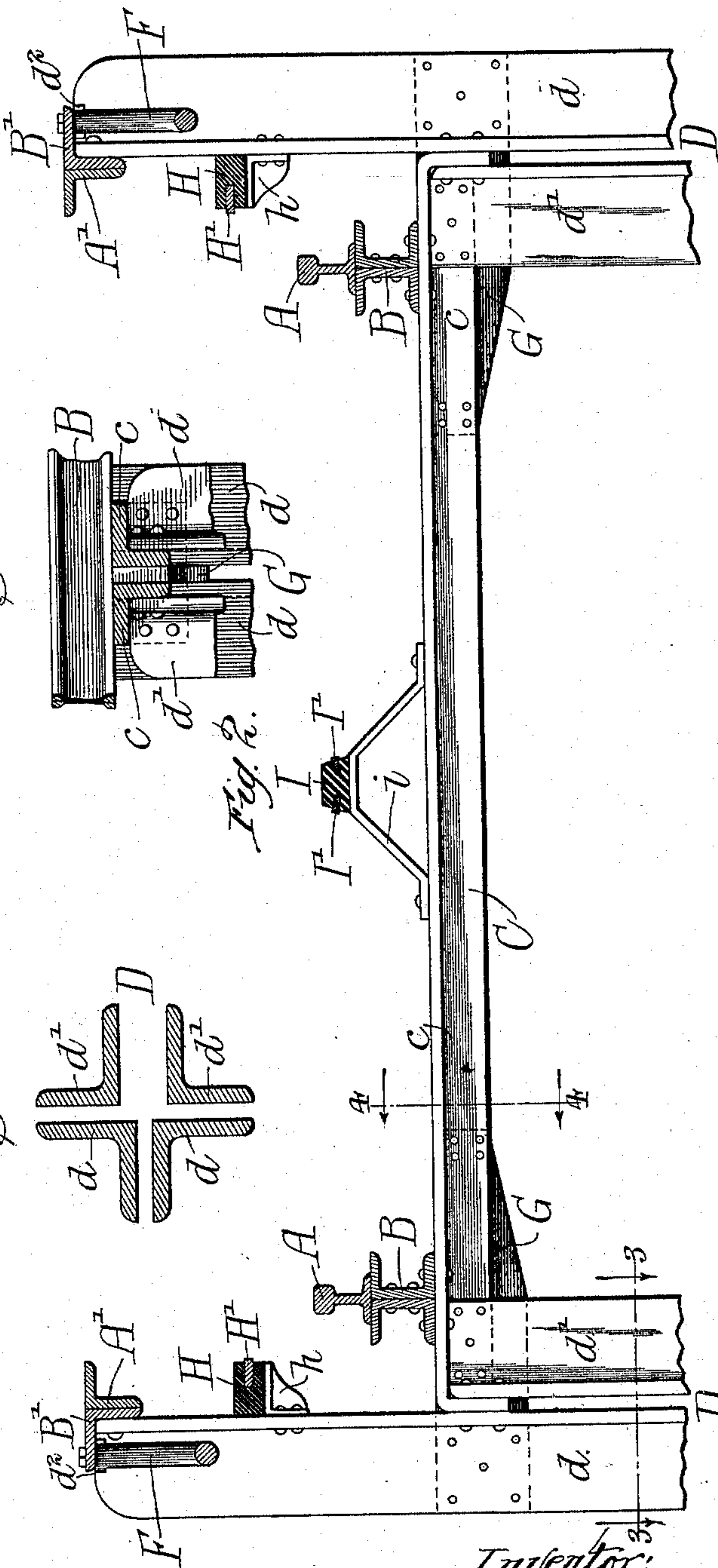
Patented Apr. 17, 1894.



Witnesses:  
J. F. Hemm  
Wm. M. Scheer.

Fig. 1.

Fig. 2.



By

Hayton, Poole & Brown

Attys.

Inventor:  
Charles C. Burton.

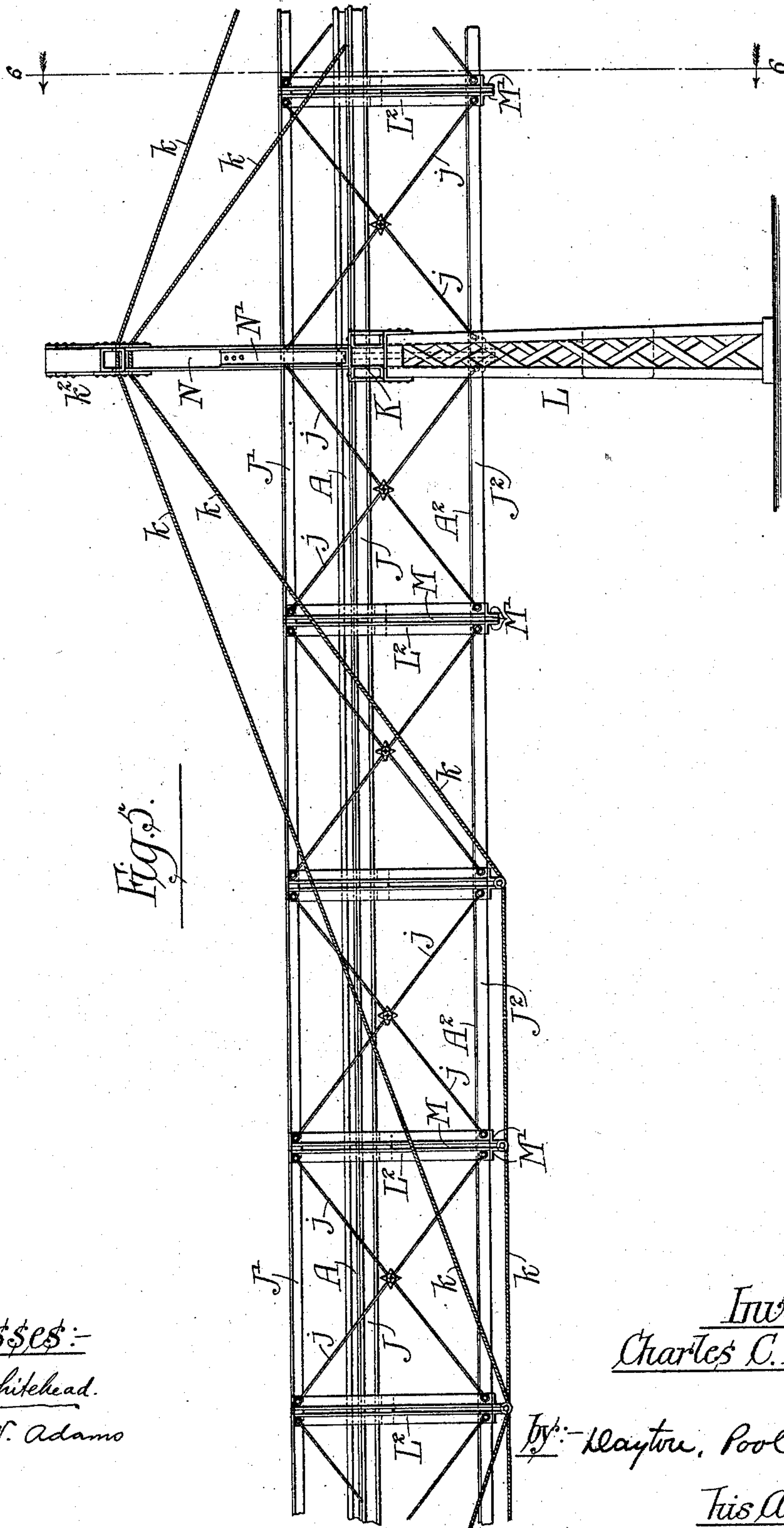
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Witnesses:-

Louis M. Whitehead.

John W. Adams

Inventor:-  
Charles C. Burton.

By:- Hayton, Poole & Brown

His Attorney's.



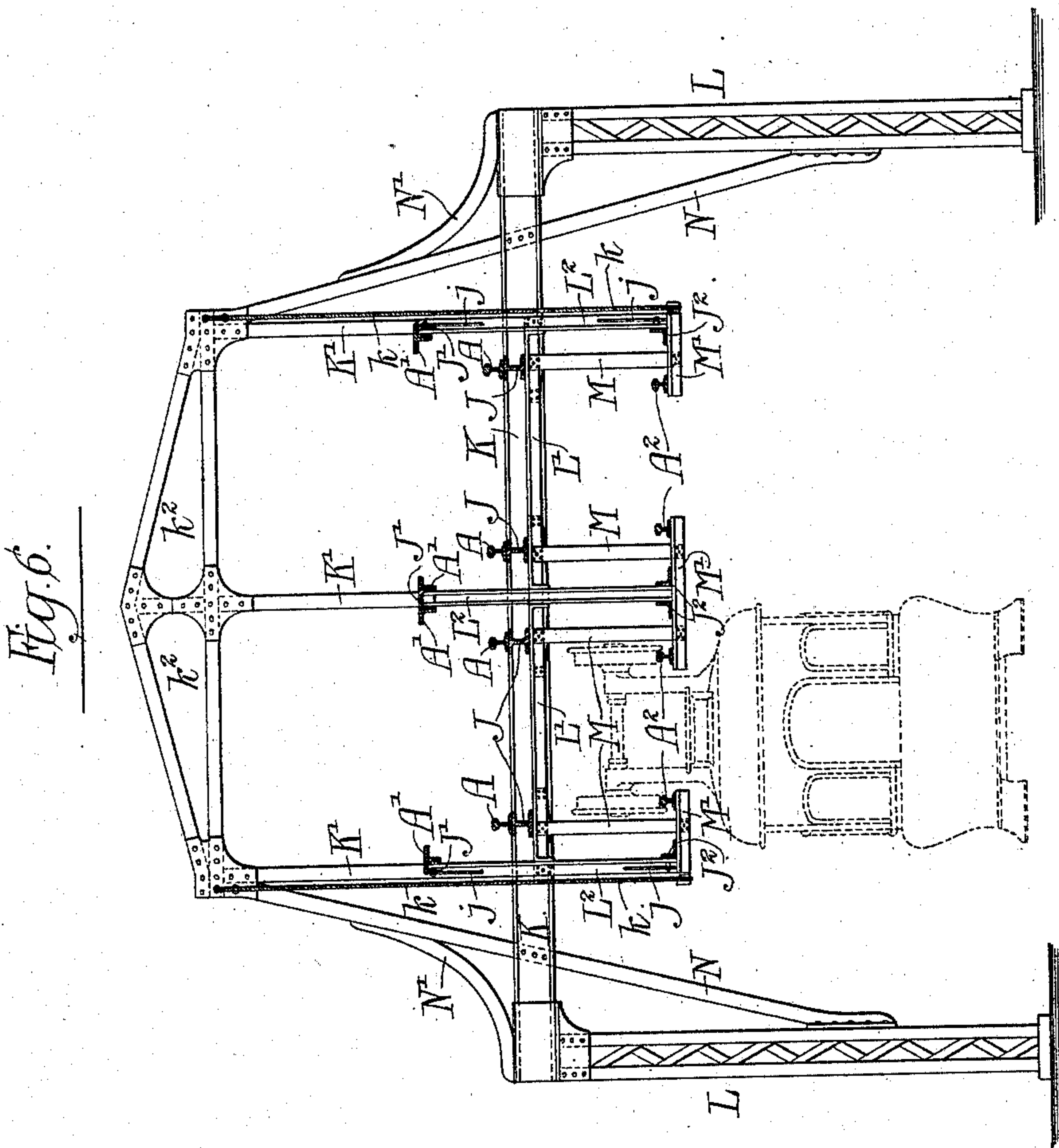
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John W. Adams

Inventor:-

Charles C. Burton.

By:- Hayton, Poole & Brown

His Attorney's:-



# UNITED STATES PATENT OFFICE.

CHARLES C. BURTON, OF UTICA, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF A PART OF HIS RIGHT TO GEORGE M. LUDLOW, OF CHICAGO, ILLINOIS, LOUIS E. HOLDEN, OF BELOIT, WISCONSIN, AND CURTIS G. HUSSEY, OF ALLEGHENY, AND JOHN C. DES GRANGES, OF PITTSBURG, PENNSYLVANIA.

## ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 518,564, dated April 17, 1894.

Application filed September 15, 1892. Renewed December 28, 1893. Serial No. 494,690. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES C. BURTON, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Railways; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in the superstructure of railways, and embraces improvements in elevated railway structures adapted for both overhead and suspended cars; to means for supplying electric current to the cars, and to switching devices for elevated or other railways.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

In the accompanying drawings illustrating my invention:—Figure 1 is a view in side elevation of an elevated structure embodying one part of my invention. Fig. 2 is an enlarged sectional view thereof, taken on line 2—2 of Fig. 1. Figs. 3 and 4 are sections on lines 3—3 and 4—4 respectively, of Fig. 2. Fig. 5 is a side elevation of another form of elevated structure, adapted for carrying two sets of track rails. Fig. 6 is a sectional view of the same, taken on line 6—6 of Fig. 5.

Referring first to the form of structure shown in Figs. 1 to 4, A A indicate supporting rails for a car or vehicle and A' A' guide or bearing rails for the same; said guide or bearing rails being located outside of and above the supporting rails and being adapted for engagement with the guide wheels of a car or vehicle of the character shown in a separate application for patent, Serial No. 445,694, filed simultaneously herewith.

B B, B' B', are the horizontal members or stringers of the track structure, of which the members B B are located beneath and support the rails A A and the members B' B' are located above and outside of the members B B and serve to support the bearing rails A' A'. Said longitudinal members B B are shown as being compound in structure consisting of

two rolled girders of U-shape in cross-section, bolted together with their central webs arranged vertically and in contact with each other and their flanges arranged horizontally and extending outward from each other.

C C, are the transverse members or cross-pieces of the track structure on which the stringers or girders B B are supported. Part of the cross-pieces C C are attached at their ends to posts or uprights D D, located at opposite sides of the structure outside of the stringers B B, while the rest are attached at their ends to short posts E E, which form struts or upright members of a truss and are supported from the posts D D by means of tension members or tie rods F F, attached to the structure at the upper ends of the posts D D and engaging the lower ends of the struts E E. Said posts D D are shown as being each formed by two pairs *d d*, *d' d'*, of angle bars, of which the outermost pair *d d* extend from the ground upwardly to the upper stringer B' and the innermost pair *d' d'* extend from the ground to the cross-pieces C C, to which they are bolted. The said cross-pieces C are shown as consisting of two angle-bars *c c*, Fig. 4, arranged side by side with their vertical flanges adjacent to each other and their horizontal flanges extending in opposite directions, the ends of said horizontal flanges being extended over the upper ends of the angle-bars *d' d'* of the posts and bent downwardly at right angles to admit of their insertion between the flanges of the said angle bars *d' d'* and the outer angle bar *d* to both of which bars they are secured by bolts inserted through the parts in the manner clearly shown in Fig. 2. The said angle bars *d' d'* rest against the outer faces of the vertical flanges of said angle-bars *c c* and are bolted or riveted to the same. As an additional means of connecting said angle-bars *c c* with the angle bars constituting the posts D, plates G G are inserted between the end portions of said angle bars and extend outwardly past the ends of the same to the outer margins of the external angle-bars *d d* of said posts; said plates G being bolted or riveted to the said angle-bars *c c* and *d d* and being also addi-



tionally secured to the angle bars  $d' d'$  by means of the same rivets which hold the said angle-bars  $d' d'$  in contact with the flanges of the angle-bars  $c c$ .

5 The stringer  $B'$  is shown as having the form of angle-bar arranged with its vertical flange in contact with the inner surface of the outer angle-bars  $d' d'$  of the posts and its horizontal flanges extending outwardly over the top  
10 of the said angle-bars, these parts being connected by means of horizontal bolts which pass through the lateral flanges of the angle bars  $d d$  and the depending or vertical flanges of the stringers  $B'$ , in the manner illustrated.

15 The struts or posts  $E E$  each consists of two angle-bars  $e e$ , which are secured to the ends of the cross-pieces  $C$  in the same manner as the bars  $d d$ ; plates  $G'$ , similar to the plates  $G$ , being employed to afford additional  
20 strength in the joints between said parts. Said bars  $e$  are bolted or riveted at their upper ends to the depending flanges of the stringer  $B'$  in the manner clearly shown in the drawings, Fig. 1.

25 The tie rod  $F$  may be secured to the posts  $D$  and struts  $E$  in any convenient manner, but as herein shown said tie-rods engage notches  $d^2 d^2$  formed in the outwardly extending flanges of the angle bars  $d d$  and also en-  
30 gage similar notches  $e' e'$ , formed in the lower ends of the outwardly extending flanges of the bars  $e e$ .

The guide or bearing rails  $A' A'$  are shown as made of L-shape in cross-section and as  
35 secured with their vertical flanges against the vertical flanges of the stringers  $B' B'$ ; this construction affording proper support for the said guide rail while at the same time enabling it to be easily removed for renewal  
40 or repair. A turn-buckle  $F'$ , applied to the disconnected ends of the tie rod  $F$  enables the tension of the same to be changed.

It will be observed that the stringers  $B' B'$ , in connection with the struts  $E E$  and tie-rod  
45  $F$  constitute a truss of simple form adapted to give strength and rigidity to that part of the supporting structure between adjacent supporting posts  $D D$ , while at the same time the location and arrangement of the stringers  
50  $B B'$  affords proper support for the supporting rails  $A A$  and guide rails  $A' A'$  when arranged in the relation described.

$H H$  indicate longitudinal strips which extend along the inner faces of the angle-bars  
55  $d d$  and  $e e$  and are secured to the same preferably by means of brackets  $h h$ . Said strips  $H$  are made in whole or in part of insulating material, preferably wood, and contain on their inner faces metal strips  $H' H'$ , consti-  
60 tuting conductors for supplying electric current to vehicles through the medium of suitable traveling contact devices attached to the vehicle and acting on the strips. The  
65 conductors thus located and supported form a simple and economical means of supplying current to the vehicle.

$I$  indicates another strip of insulating ma-

terial, preferably of wood, which runs longitudinally of the track between the rails  $A A$  and is supported from the cross-pieces  $C$  by  
70 means of metal brackets  $i$ . Said strip  $I$  is provided in its side margins with metallic strips  $I' I'$ , forming electric conductors by means of which electrical connection may be  
75 made with the car through the medium of suitable traveling contact devices, for the purpose of establishing telegraphic or telephonic connection with said car.

In Figs. 5 and 6 I have shown a construction in an elevated track supporting structure which contains the same general features  
80 of construction hereinbefore described, but is adapted for sustaining two sets of cars, one resting on the supporting rails above the main part of the structure and another resting on  
85 track rails suspended below those first mentioned. In this instance  $A A'$  are supporting and guide rails corresponding with those before described, and  $A^2 A^2$  indicate a third set  
90 of supporting rails adapted to sustain a suspended car by means of wheels attached to the top of the car and resting on said rails.

The suspended car referred to is one which is supported adjacent to but clear of the ground,  
95 as clearly indicated in dotted lines in Fig. 6.

The track supporting structure in this instance embraces longitudinal stringers  $J J'$  corresponding with the stringers  $B B'$  hereinbefore described, main transverse girders  
100  $K$  which rest on supporting posts  $L L$ , intermediate transverse pieces  $L' L'$ , corresponding with the crosspieces  $C$  of Figs. 1 to 4, and vertical posts  $L^2 L^2$ , arranged at points intermediate to the posts  $K'$ . In this instance the  
105 posts or struts  $L^2$  are extended downwardly past or beyond the cross-pieces  $L'$  by which the stringers  $J$  are supported and said posts are attached at their lower ends to longitudinal  
110 stringers  $J^2$  arranged vertically beneath and parallel with the stringers  $J'$ . Inclined tie-rods  $j j$  extend from the bottom of each post upwardly to the upper ends of adjacent posts,  
115 thereby giving stiffness to the structure and forming in effect a truss. In cases where the distance between the supporting posts  $L L$  is great, posts  $K' K'$  extend upwardly from the girders  $K K$  and from the upper ends of the same suspension rods or cables  $k k$  extend  
120 downwardly to the struts  $L^2 L^2$  of the structure between the said supporting posts  $L$ . These suspension rods or cables may be arranged in any desired or preferred manner; the same being herein shown as engaged one  
125 with the middle post of the span and the other with two posts which are intermediate between said middle post and the supporting posts of the span. For the purpose of giving stiffness and rigidity to the structure the posts  
130  $K' K'$  are connected at their upper ends with cross-pieces  $k^2 k^2$ .

The foregoing description applies as well to a single as a double track structure and the suspension rods or cables  $k k$  are located at the sides only of the same, the interme-



diate truss which is common to both tracks being unprovided with such cables.

As a means for supporting the lowermost rails  $A^2 A^2$ , suspension rods or bars  $M M$  are attached to the crosspieces  $L' L'$  a short distance within the vertical struts  $L^2 L^2$  and said bars  $M M$  are secured to short transverse bars  $M'$  which are attached at their outer ends to the stringers  $J^2 J^2$  and the struts  $L^2 L^2$  and extend inwardly past the said bars  $M M$  in the manner of brackets to afford support on their inwardly projecting ends for said track-rails  $A^2 A^2$  which are located at a sufficient distance inside of the suspension bars  $M M$  to enable the wheels to properly run upon said track rails.

From the construction described it will be obvious that the main structure shown in Figs. 5 and 6 is generally similar to that shown in Figs. 1 to 4, the main difference being that the vertical struts or posts of the truss portion of the structure are extended downwardly so as to make a deeper truss and one having greater strength. The parts constituting the truss are in this instance connected with each other in substantially the same manner as hereinbefore described in detail in connection with Figs. 1 to 4.

The elevated structure illustrated in Figs. 5 and 6 is adapted for use in cases where the supporting posts  $L L$  are located at a distance apart greater than the width of the elevated structure proper and a connection is afforded between the upper ends of the posts and the elevated structure mainly by means of the transverse girders  $K K$ , which extend to a considerable distance past or outside of the truss structure and rest at their ends on the tops of the posts. As a means, however, of additionally supporting the structure from the posts  $L$ , inclined struts or braces  $N N$  are secured to the inner faces of the posts  $L L$  and extend upwardly and inwardly to the upper ends of the posts  $K' K'$  to which they are secured in the manner shown or otherwise. Other braces  $N' N'$ , shown as made of curved form, extend from the outer ends of the girders  $K K$  upwardly to said struts  $N N$ . The girders  $K K$  desirably consist of two U-shaped beams placed side by side with a space between them, as clearly seen in Fig. 5, and the struts  $N N$  pass between said beams in the manner illustrated.

I claim as my invention—

1. The combination with supporting rails and guide rails located above and outside of the same, of an elevated structure comprising longitudinal stringers sustaining the supporting rails and guide rails, cross-pieces extending beneath and outside of the stringers which sustain the supporting rails, and up-

right parts or posts attached to said cross-pieces and to the stringers supporting the guide rails, substantially as described.

2. The combination with supporting-rails and guide-rails located above and outside of the same, of a track-supporting structure comprising lower and upper stringers sustaining the supporting and guard-rails, supporting posts, cross-pieces attached to said posts and supporting the lower stringers, intermediate cross-pieces attached to said stringers and uprights attached to said intermediate pieces and to the upper stringers, said uprights and upper stringers forming respectively the vertical struts and upper longitudinal members of trusses between the supporting posts, substantially as described.

3. The combination with supporting rails and guide rails located above and outside of the same, of a track supporting structure comprising lower and upper stringers sustaining the supporting and guide rails posts or uprights which extend upwardly to and sustain the upper stringers, cross-pieces attached to said posts and supporting the lower stringers, intermediate cross-pieces between the posts attached to said stringers, vertical struts attached to said intermediate cross-pieces and to the upper stringers and tension members or tie rods sustaining the said struts from the posts, substantially as described.

4. An elevated track supporting structure comprising lower and upper longitudinal stringers, cross-pieces attached to the lower stringers and supporting posts consisting of inner and outer bars of which the outer bars extend upwardly to and sustain the upper stringers and are attached to the ends of the crosspieces, and the inner bars terminate at and are secured to the said ends of the cross-pieces, substantially as described.

5. A track supporting structure comprising lower and upper longitudinal stringers, transverse pieces attached to the lower stringers and supporting posts each consisting of two outer and two inner bars, of which the outer bars extend upwardly to and sustain the upper stringers and the inner bars terminate at and are attached to the said ends of the cross-pieces, and vertical plates  $G G$ , attached to the ends of the cross-pieces and extending between and secured to the said inner and outer bars of the posts, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

CHARLES C. BURTON.

Witnesses:

C. CLARENCE POOLE,  
GEORGE W. HIGGINS, Jr.