No. 799,908. PATENTED SEPT. 19, 1905.

D. HUMPHREY.

ELEVATED RAILWAY.

APPLICATION FILED MAY 18, 1904.

FIG. 3.

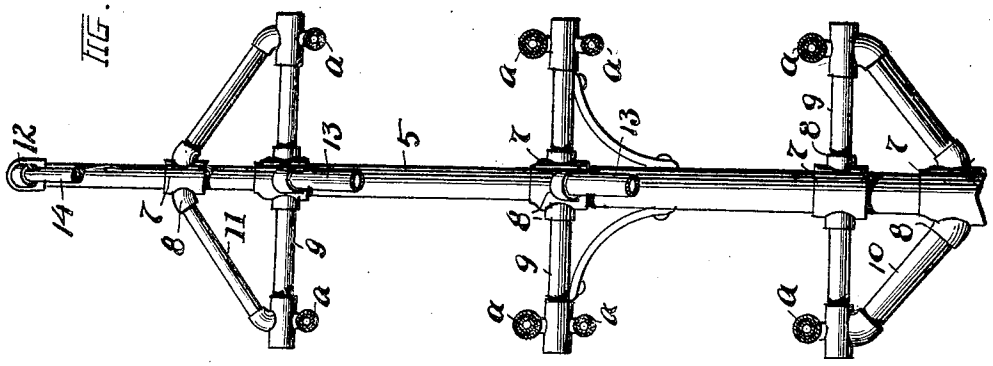


FIG. 1.

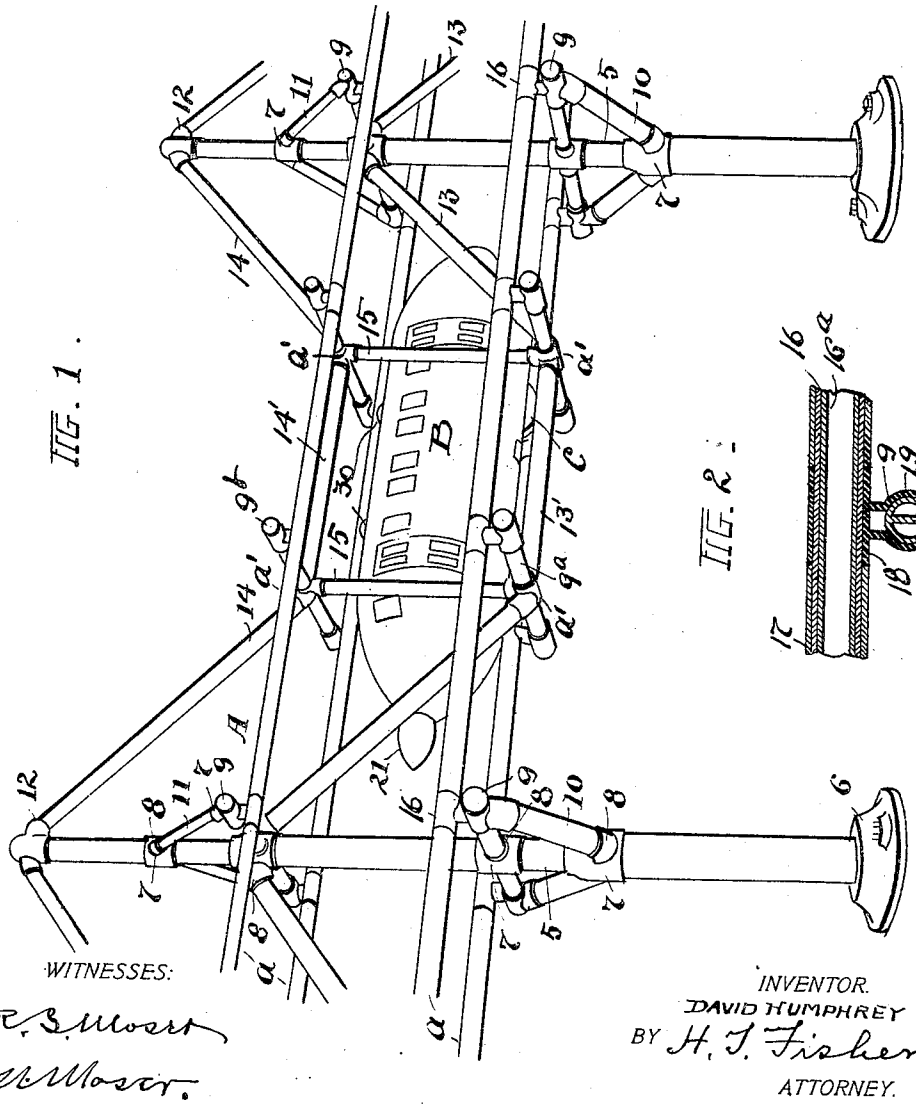


FIG. 2.

WITNESSES:

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ELEVATED RAILWAY.

No. 799,908. Specification of Letters Patent. Patented Sept. 19, 1905.

Application filed May 18, 1904. Serial No. 208,542.

To all whom it may concern:

Be it known that I, DAVID HUMPHREY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Elevated Railways; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a certain novel and useful improvement in elevated railways, all substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, Figure 1 is a perspective view of a section or span of the railway and of car mounted therein. Fig. 2 is a longitudinal sectional view of a portion of one of the tracks or rails with a cross-section of a supporting-arm therefor. Fig. 3 is a cross-sectional view of the elevated structure adapted to accommodate two cars on each side, one above the other, whereas in Fig. 1 provision is made for only two cars, one on each side.

Referring now to the accompanying drawings in detail, A designates the supporting structure or elevated framework for the car. The said structure A consists, essentially, of a continuous series of individual masts or posts 5, firmly set in the ground and embedded in cement or other sustaining material to make them permanently rigid and having flanges or collars 6 about their base to more perfectly steady their position, if possible. The said posts are preferably formed of a plurality of relatively large tubular sections united at their adjacent ends by means of collars 7, and each of said collars is provided with a plurality of tubular threaded sockets 8 of varying angle about its side and designed to receive portions of the rail-supporting braces or brackets, as will now appear. Thus threaded in certain of the sockets 8 are horizontal track-supporting arms 9, which as to the lower arms are in turn supported from beneath by inclined braces 10, engaged with the ends of said arms by suitable joints secured to standard A by threading into certain of the sockets 8 upon collar 7 below said arm. The upper of the several sets of horizontal arms 9 are braced and connected through the medium of downwardly-inclined bracket-arms 11, engaged in suitable joints on the outer ends of arms 9 and at the other end in sockets 8 on collar 7. The entire structure is further braced and supported by a span mechanism between the successive posts comprising lower struts and upper struts connecting the posts 5 in spans about thirty feet long, said struts comprising certain tubular parts hereinafter fully described, and connected with the top of posts 5 by means of T-joints and to said posts lower down by means of the sleeves 7. Now the struts thus referred to comprise tubes or bars 13 and 14, which may be more particularly defined as inwardly and downwardly inclined supporting-tubes in parallel planes of forty-five-degrees inclination and at successive elevations. The upper and lower arms 9^a and 9^b for supporting tracks *a* between posts, vertical tubes 15 connecting arms 9^a and 9^b centrally, and central longitudinal connecting-tubes 13′ and 14′ between the lower ends of inclined tubes 13 and 14 above and below and parallel to each other and with tracks *a*, but at right angles to vertical tubes 15. The tracks *a* are supported from or upon the extremities of arms 9^a and 9^b between posts as they are upon arms 9 at the posts, and the construction of the span necessarily is such as will hold the tracks firmly on the same level in the spans as with the posts. This, however, has to be done with provision or allowance for contraction or expansion with the change of seasons or current changes in temperature, and hence the novel construction of spans, as shown, to accommodate such changes and at the same time build a span or strut which cannot sag and will bear all strain coming upon it for an indefinite period. The forty-five-degree angle of tubes 13 and 14 is particularly advantageous to give and take contractions and expansions without showing in the level of the spans, and the bridging of the central space in the span by a substantially rectangular framework with which the ends of tubes 13 and 14 connect is equivalent in all essential particulars to an additional post set at that point. It will be noted that all of said braces, arms, posts, and other parts are formed of suitable tubes or pipes, and the structure as a whole is designed to support the track-rails *a*. These rails are carried on the outer extremities of the horizontal cross-arms 9, 9^a, and 9^b and are arranged in parallel pairs one above the other, so that an upper and a lower rail constitute a track for

a car. Each rail is formed, preferably, of an inner pipe 16 and an outer pipe or pipe-section 17, sleeved over 16, and the outer sections are slightly spaced apart at their ends to make room for T-collars 18, sleeved over pipe 16 and serving as the immediate supports of rails or tracks *a* and which are flush with outer tubes or pipes 17. The said collars 18 have portions 19 threaded or otherwise secured upon the extreme ends of arms 9, 9^a, and 9^b. Another inner tube 16^a may also be used, if desired, the same to be so arranged as to break joints with the sections 16 and 17, thus making the track three thicknesses deep. The arms 9, 9^a, and 9^b may one or all have flat steel reinforcing-strips set centrally therein to increase their strength.

All the central supporting-posts A are equipped with lateral arms 9 in the manner substantially as shown and described and for one or more lines of cars at each side. The said arms have their own braces or supports top and bottom, respectively, as above described, and any auxiliary means that may be necessary can be employed to give increased support to the ends of cross-arms 9. These equipments appertain to said arms in relation to posts 5, and the truss mechanism above described has to do with supporting the tracks between said posts.

While I have herein shown and described one particular embodiment of my invention, it will be understood that I do not confine myself to all the various details of construction shown, as there may be modifications and variations with regard to details without departing from the spirit of the invention or sacrificing any of the advantages thereof.

Now there are a number of advantages peculiar to my construction of road which are not known to exist in any other road familiar to me and which give it especial value both for city and outlying traffic. For example, it is possible by this construction to build an elevated structure which will stand perfectly rigid and which needs no special provision for expansion and contraction in its framework and track and has tight joints in all temperatures.

Second. The construction of struts with forty-five-degree hangers and rectangular middle frames accommodate temperature changes and furnish a resistance both ways, up and down. Each such span has eleven squares or parallelograms, which are a source of great rigidity.

Third. My form of structure occupies the minimum of surface-room possible in an elevated road and being tubular throughout obscures light less and is less objectionable to the eye than any other known to me.

Fourth. There is no expense of maintenance by reason of the tubes being permanently built together with no portion to wear out.

Fifth. The close-jointed double or triple tubular track makes it possible to use concave rubber tires on the wheels, thus insuring a noiseless traffic.

Sixth. Almost any rapid rate of speed may be attained with perfect safety—say a rate of three hundred miles per hour—because the tubular make-up of the structure eliminates or reduces to a minimum frictional resistance between the structure and the car. This also enables me to carry the loads with very much less expenditure of energy than would be required with a framework of squares and angles to retard the progress of the car.

It will be noticed that all parts of the "struts," so called, are in the same vertical plane, the same comprising the several parts indicated by 13, 14, 13′, 14′, and 15, while all the supports for the tracks or rails associated with the posts are at right angles to the struts and likewise in the same vertical plane. These comprise the arms 9 and braces 10 and 11.

What I claim is—

1. In elevated railways, a series of posts and spans between posts comprising a plurality of parallel inwardly and downwardly inclined tubes and a center portion between said tubes of rectangular outline and in the same vertical plane therewith, substantially as described.

2. In elevated railways, a series of tubular posts and spans connecting said posts comprising each a plurality of parallel inwardly and downwardly inclined tubes at each end of the span and a rectangular central portion with which said tubes connect at its top and bottom respectively, and rail-supporting cross-arms connected with said rectangular portion at its top and bottom, substantially as described.

3. In an elevated railway, a series of posts provided with collars at intervals and spans connecting said posts through said collars, and comprising a plurality of parallel tubes extending inwardly and downwardly from each post at an angle of substantially forty-five degrees, and a central rectangular frame at the inner ends of said tubes and in the same vertical plane therewith, cross-arms engaged with each corner of said central frame above and below and car-tracks supported on said cross-arms, substantially as described.

4. An elevated railway comprising sectional tubular posts and collars about the joints of said posts having sockets at their sides, struts connecting said posts comprising parallel inclined tubes at different elevations engaged in said sockets and a rectangular frame having said tubes connected with the four several corners thereof, cross-arms extending laterally at both sides from the four corners of said frame, and from collars on said posts, and tracks for the cars carried by the said several cross-arms at and between the posts, substantially as described.

5. In an elevated railway, the combination of a series of posts formed each of coupled tubular sections, tubular arms extending lat-

erally from said posts, tubular braces supporting the ends of said arms and tubular track-rails supported by said arms, the said arms and braces and rails being connected by T-joints on the ends of said arms, substantially as described.

6. In an elevated-railway system, the combination of a plurality of posts, each post being formed of tubular sections and occupying connecting adjacent ends of said sections provided with sockets in their sides, tubular rail-supporting arms threaded in certain of said sockets, and braces for said arms engaged in said sockets, and longitudinal struts connecting said posts having their ends threaded in certain of said sockets, substantially as described.

7. In an elevated railway, the combination of vertical posts, a plurality of laterally-extending arms carried thereby at different elevations, supports from the posts at the outer end of each of said arms for the track-rails, and track-rails comprising a tubular inner portion and sleeve members incasing said inner portion, the adjacent ends of said sleeve members being spaced apart and the said supports for the track-rails occupying the space between said sleeve members and flush therewith, substantially as described.

8. In railways, a rail consisting of a plurality of tubes sleeved one over the other, in combination with a support for the rail comprising a cross-arm at right angles to the rail and a substantially T-shaped support for the rail thereon, said support having a sleeve through which the rail extends and the outer tubes of the rail abutting against its opposite edges and flush therewith, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

DAVID HUMPHREY.

Witnesses:
R. B. MOSER,
C. A. SELL.