(No Model.)

J. P. HARPER.

ELEVATED RAILWAY.

No. 458,846. Patented Sept. 1, 1891.

Fig. 1.

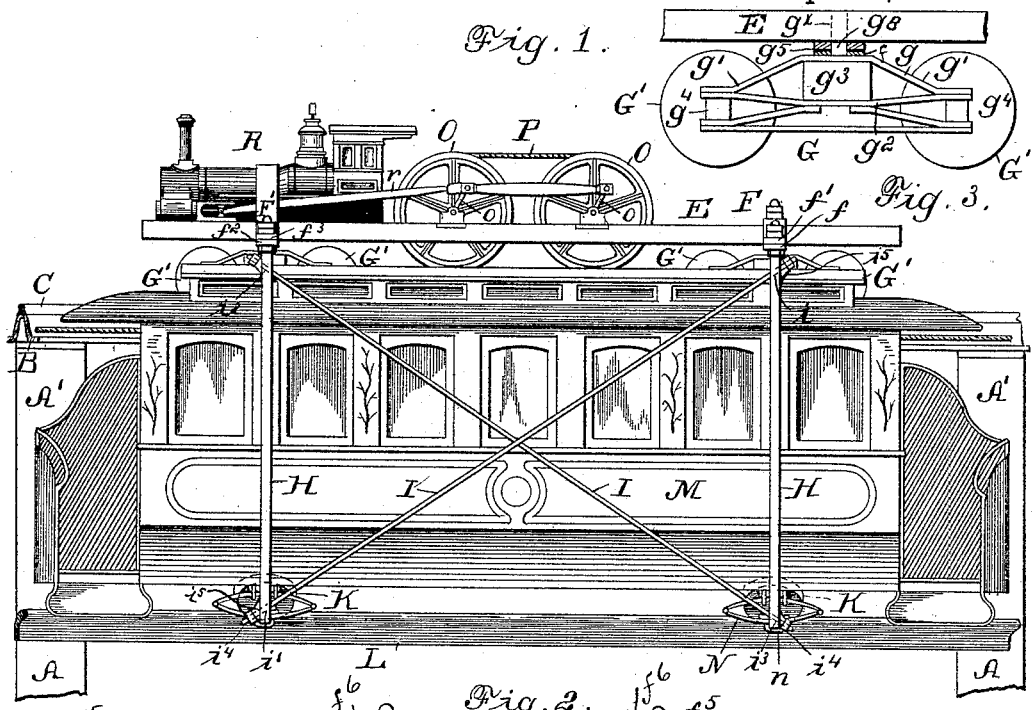
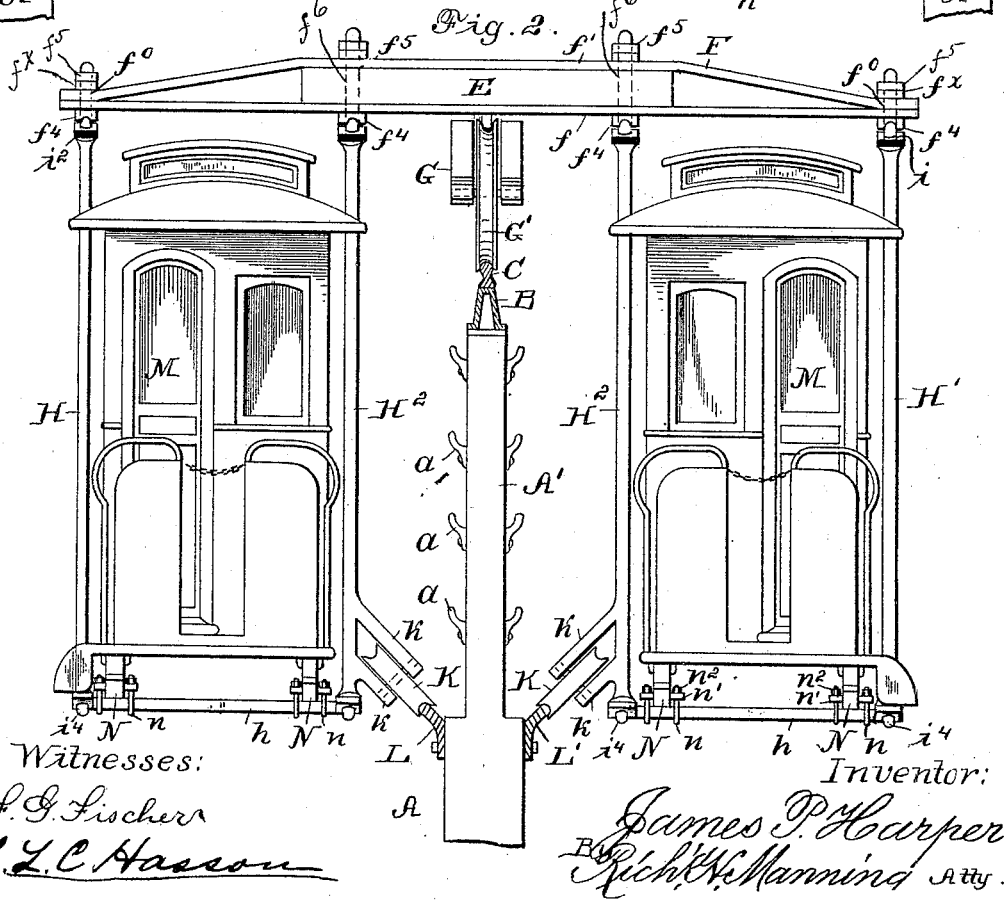


Fig. 3.

Fig. 2.



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ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 458,846, dated September 1, 1891.

Application filed November 24, 1890. Serial No. 372,552. (No model.)

To all whom it may concern:

Be it known that I, JAMES P. HARPER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Elevated Railways; and I do hereby declare that the following is a full, clear, and exact description thereof, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention has for its object, first, to enable suspended car-carrying frames on both sides of a stationary column in elevated railways to preserve their rigidity in moving upon the track; second, to preserve the equipoise of suspended car-supporting frames in both sides of the stationary columns and resist the combined tendency to an oscillatory and an upward and downward movement of the suspended frame under varying weights; third, to counteract the jar of the car-body within the car-supporting frame.

In the drawings, Figure 1 is a side view of one of the suspended car-supporting frames, shown upon one side of a single-track rail of an elevated railway, showing the motor overhead supported by the trucks, the car-supporting truss-beam, the lower guide-rail, and the car supported upon springs within the car-supporting frame. Fig. 2 is a cross-sectional view of the main track of the elevated railway, showing the broken upper end portion of one of the supporting-columns and the single main-track rail and the guide-rails; also showing an end view of the suspended car-supporting frame and cars, the guide-wheels upon the car bearing upon the guide-rails and the car resting upon springs within the car-supporting frame. Fig. 3 is a detail view of a portion of the platform, showing the truck-frame and wheels and the pivots between the said frame and platform.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A A represent stationary columns, which are placed in a single line and at suitable distances apart in the line of the street or road. Ordinarily the columns are of the same height and are made of the proper width to sustain heavy loads.

Extending the entire length of the road and from one column A to the adjoining column and attached rigidly to the upper end portion of said columns is a continuous horizontal rail-chair B.

To the rail-chair B is attached rigidly a continuous single-track rail C. Above and parallel with the rail C is a platform E, which is made nearly of the same length of the cars which it is designed to support and narrow in width.

To the under side portion of the platform E near one end is attached the lower bar f of the truss-beam F. Said bar f extends in a transverse direction to the platform E and a suitable distance from both sides of said platform to support the suspended car-frame, hereinafter described. Upon the top portion of the platform E, directly above and extending in a like direction to that of the said bar f, is a truss-bar f', both end portions of which bar are bent downwardly at an angle to the bar f' from both sides of the platform E and caused to rest upon said bar f. At the other end of the platform E, and attached to said platform in a similar manner as described by the truss-beam F, is a truss-beam F', the transverse bar f^2 of which beneath the platform E is of the same length as the bar f of the truss-beam F, and a truss-bar f^3 upon the upper side portion of said platform is bent downwardly upon the bar f^2 in the same manner as the bar f' in beam F.

Beneath the bar f and above the rail-chair B are the upper horizontal axle-guards $g\ g$ of the truck-frame, which are placed a slight distance apart in a parallel position and extend in a transverse direction to and an equal distance from the said bar f. Both ends $g'\ g'$ of the respective guards $g\ g$ are bent a short distance in a downward direction.

Beneath the upper guards $g\ g$ are the lower axle-guards $g^2\ g^2$, which are the same as the guards $g\ g$, reversed in position, and between each of the guards $g\ g^2$ is placed a stay-block g^3, to which the said guards $g\ g^2$ are rigidly attached.

Between the ends $g'\ g'$ of each pair of axle-guards $g\ g^2$ are secured the journal-boxes g^4

g^4, in which are journaled the axles of the grooved truck-wheels G′ G′, which wheels are in a single line and rest upon the single track B.

To the upper guards g g of the truck-frame, at one end of the platform E, is rigidly connected one end of a pivot or king-bolt g^8, the other end of which bolt extends upwardly and through the respective lower truss-bars f f and also through the perforation $g^\times$ in the platform E. Between the platform E and the truss-frame and rigidly attached to said king-bolt is rigidly attached a circular shoulder-plate g^5, which supports the platform E. The other end portion of the platform is connected with similar truck-frame and wheels in the same manner.

For the purpose of suspending the cars two frames are attached to the truss-beams F F′ and constructed as follows: Through the extreme outer end portion of each of the truss-beams F F′ and both ends of said frames and the respective bars f f' f^2 f^3 are made the vertical perforations f^0, and through the said perforations at one end of each of said beams from a position beneath the said truss-beams F F′, upon one side of the track C, is inserted the upper screw-threaded end portion of the respective suspension-rods H H. Upon the other side of the track C and through the perforations f^0 in the other ends of each of said truss-beams are inserted the upper ends of the respective suspension-rods H′ H′. The end portions of each rod H H′ above the truss-plates f' f^3 are provided with jam-nuts $f^\times$ and lock-nuts f^5, so as to sustain the weight of the suspended cars. Beneath the horizontal plates f f^2 the diameter of each one of the rods H H′ is slightly increased, so as to form shoulders f^4. Through the truss-frames F F′, and also through the platform E, a short distance from the truck-wheels G′ G′ and the proper distance from the ends of the suspended rods H H upon the side of the track C to correspond nearly to the width of the passenger-car, are made the perforations f^6, through which perforations are inserted the upper ends of the suspension-rods H^2 H^2, and which rods are constructed and secured to each one of the truss-frames in the same manner as the rods H H′. To the lower end of the suspension-rods H H′ upon the truss-beam F, upon one side of the track-rail C, is then rigidly attached one end of a transverse bar h, the other end of which bar is rigidly connected with the parallel rod H^2 upon the same side of said track, and in like manner similar transverse supporting-rods upon the other side of the track upon beam F and also upon beam F′.

To bind the suspension-rods upon the separate beams F F′ upon both sides of the track rigidly together, cross stay-rods are employed in the following manner: Through one of the suspension-rods H upon the end of truss-beam F and the shoulder f^4, at the upper end of said rod beneath the horizontal bar f of said truss-beam, is made at an angle the perforation i. Through the lower end portion of the suspended rod H upon the same side of track C and upon the truss-beam F′ is made at a like angle to the perforation i a perforation i'. In the upper end portion of the said suspension-rod H through the shoulder f^4 and through the lower end portion of the suspension-rod H upon beam F is made at a like angle the respective perforations i^2 i^3.

Through the perforation i in the rod H on beam F, and also through the perforation i^2 in rod H on beam F′, are inserted the respective upper screw-threaded end portions of the separate brace-rods I I, which cross each other. The lower screw-threaded end portions of the rods I I are inserted through the respective perforations i' i^3 in the lower ends of the suspension-rods H H upon the beams F F′.

Upon both ends of the rods I I are the securing-nuts i^4, which bear upon the shoulders i^5, which are cast upon the outer side portions of each suspension-rod near each perforation to receive the said brace-rods.

The suspension-rods H′ H′ upon the other side of track C, and also the suspension-rods H^2 H^2 upon the truss-beams F F′, are braced by means of similar cross brace-rods, which are secured to the said rods in the same manner as described upon the rods H H.

Beneath the track-rail C and forming the lower chord of the elevated structure and rigidly attached to one side of the columns A A is a continuous guide-rail L. Said guide-rail is placed in position upon the side of the columns A a slight distance below a line horizontal with the lower ends of the suspension-rods H^2 H^2 upon the truss-beams F F′, and the upper portion of said rail is bent outwardly at an angle to the column A. Upon the other sides of the columns and parallel with the guide-rail L is rigidly attached a continuous guide-rail L′ the upper portion of which rail is bent outwardly at an angle to the column and also to the other guide-rail.

To the inner side portion of the suspension-rods H^2 H^2 upon one side of track C and near the lower ends of said rods are attached the brackets k k. These brackets are placed a short distance apart and are bent downwardly in the direction of the guide-rail L upon the columns A A. Similar brackets are attached to the other suspension-rods H^2 upon the other side of the track C, upon which side of the track the brackets are bent in the direction of the guide-rail L′.

Between the brackets k k upon each suspension-rod and journaled in said brackets is grooved guide-wheel K.

Between the suspension-rods H H and H^2 H^2, forming one supporting car-frame upon one side of the track C, is arranged a car-body M. Said car-body extends in height within a proper distance of the truss-beams F F′ and is mounted upon elliptical springs N N, which springs are secured to the under

side portion of the car-body and also rest upon the transverse supporting-bars h h, attached to the suspension-rods H H^2. Each one of the springs N N is secured to the bars h by means of the clasps n n, which pass beneath said bars, and the end portions bent upwardly and screw-threaded. Across the lower leaf of each spring N is placed a perforated plate n', through which is inserted the ends of the clasp n, and to said ends are fitted the securing-nuts n^2. Upon the other side of track C and between the suspension-rods H' H^2 is arranged a similar car-body M.

In the propulsion of the suspension car-frame and cars I employ, preferably, the cable traction-drum O O, shown and described in an accompanying application. The cable P is wound around said drums one or more times and the ends of the cable extended in the opposite direction upon the side of the track.

Upon the forward end of the platform E is mounted an engine R, the pitman r of which is connected with the cranks o o.

In the construction of the upper portion A' of each one of the columns A above the guide-rails L L', I make said portion less in width than that of the portion of the columns below said guide-rails, and upon both sides of said portion A' is attached rigidly the series of cable-brackets a a a, which are placed a short distance apart in a vertical line and support relay-cables, which are in readiness for use in the event of a break occurring in the main cable extending around the drums.

In the operation of the suspended car-frame and cars power is communicated from the engine R to the drums o o, and the traction of the drums upon the cable propels the trucks upon the track, and in this mode of propulsion the traction is obtained through the revolving power-drums o o within the coils of the cable P under proper tension. The weight ordinarily of the cars is first thrown upon the suspension-rods and then upon the truss-beams F F', and in my construction of said beams the weight of one suspended car and frame is distributed the entire length of the beam. Under varying weights each car-supporting frame and car suspended from the truss-frame is subject to the combined forces of depression and oscillation.

In describing curves in the track the centrifugal force which operates in my construction of the railway to throw the car-supporting frame upon the outer side or in line with the greatest length of track-rail away from said rail is counteracted by the inner flange of the grooved wheels K, which impinges upon the guide-rails in all the movements of said wheels, and at the same time said wheels sustain the varying weights which are consequent on the loading and unloading of vehicles. Upon such curves in the track the slight change of position of the truck-frames in relation to the car is afforded by the king-bolt g^8, which permits the platform E and the car M to maintain a uniform parallel position.

I do not confine myself in this system of elevated railways to a single-track rail, as this construction may be varied and two rails used, which would add to the steadiness of the suspended frames.

My invention does not contemplate a motor for each car. It is intended that each motor shall have sufficient power to draw a train. I may use a grooved guide-rail upon the side of the columns instead of a grooved wheel, as shown, and accomplish the same purpose.

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an elevated-track structure in elevated railways and with a movable platform thereon, of transverse car-supporting truss-beams at or near the points of support of said platform upon said track, and a car-supporting frame consisting of parallel suspension-rods on both sides of said elevated structure attached rigidly at their upper ends to each of said truss-frames, and a transverse bar rigidly connected with the lower ends of said parallel suspension-rods, and a car-body within each of said suspended frames, substantially as and for the purpose described.

2. The combination, with an elevated-track structure in elevated railways having track-supporting columns and track-rails, of truck-frames having wheels upon said rails and a platform supported by said truck-frames, transverse beams rigidly connected with said platform at or near the points of support of said platform upon said truck-frames, and rigid car-supporting frames on both sides of said elevated structure attached to and suspended from the said transverse beams, guide-rails on said columns beneath said track-rails, and grooved wheels journaled in suitable supports upon the side of said car-supporting frame, inclined outwardly and downwardly from said frame and resting upon said guide-rails, substantially as and for the purpose described.

3. The combination, with an elevated-track structure in elevated railways having track-supporting columns and track-rails, of truck-frames having wheels upon said rails and a platform supported by said truck-frames, transverse beams rigidly connected with said platform at or near the points of support of said platform upon said truck-frames, and rigid car-supporting frames on both sides of said elevated structure attached to and suspended from said transverse beams, guide-rails beneath said track-rails upon the side of said columns inclined outwardly and upwardly, and guide-wheels journaled in suitable bearings upon the inner side of said suspended frame in the path of said guide-tracks

and inclined outwardly and downwardly and bearing upon said guide-rails, for the purpose described.

4. The combination, in elevated railways having track-supporting columns and a track-rail, of a movable platform thereon having a supporting-beam and a car-frame suspended from said beam, yielding supports within said car-supporting frame, and a car-body within said frame resting upon said supports, substantially as and for the purpose described.

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