No. 743,786. PATENTED NOV. 10, 1903.

C. I. WHITE.

ELEVATED RAILWAY.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

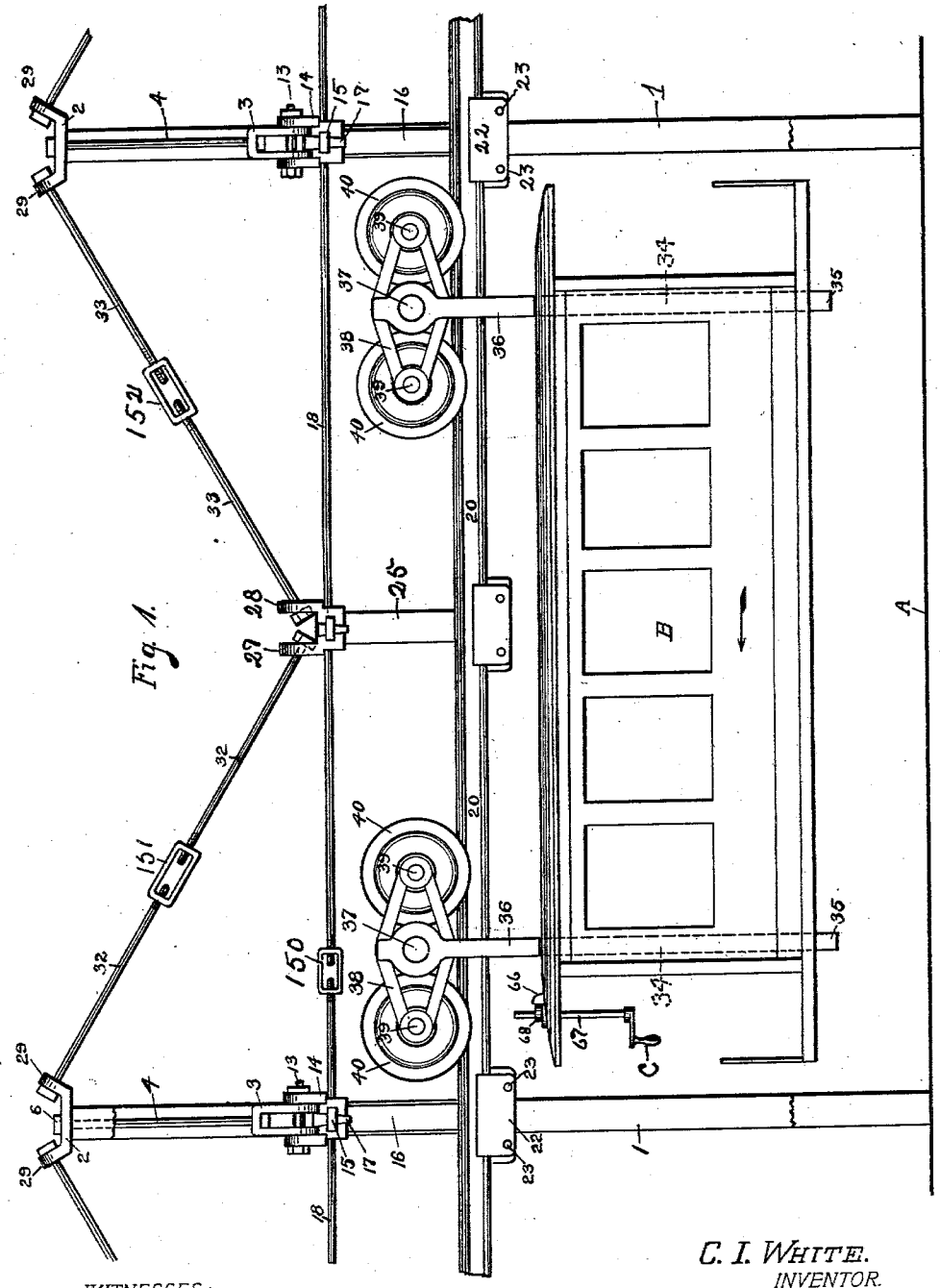



Fig. 1.

WITNESSES:

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BY Robert W. Tindle
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No. 743,786. PATENTED NOV. 10, 1903.

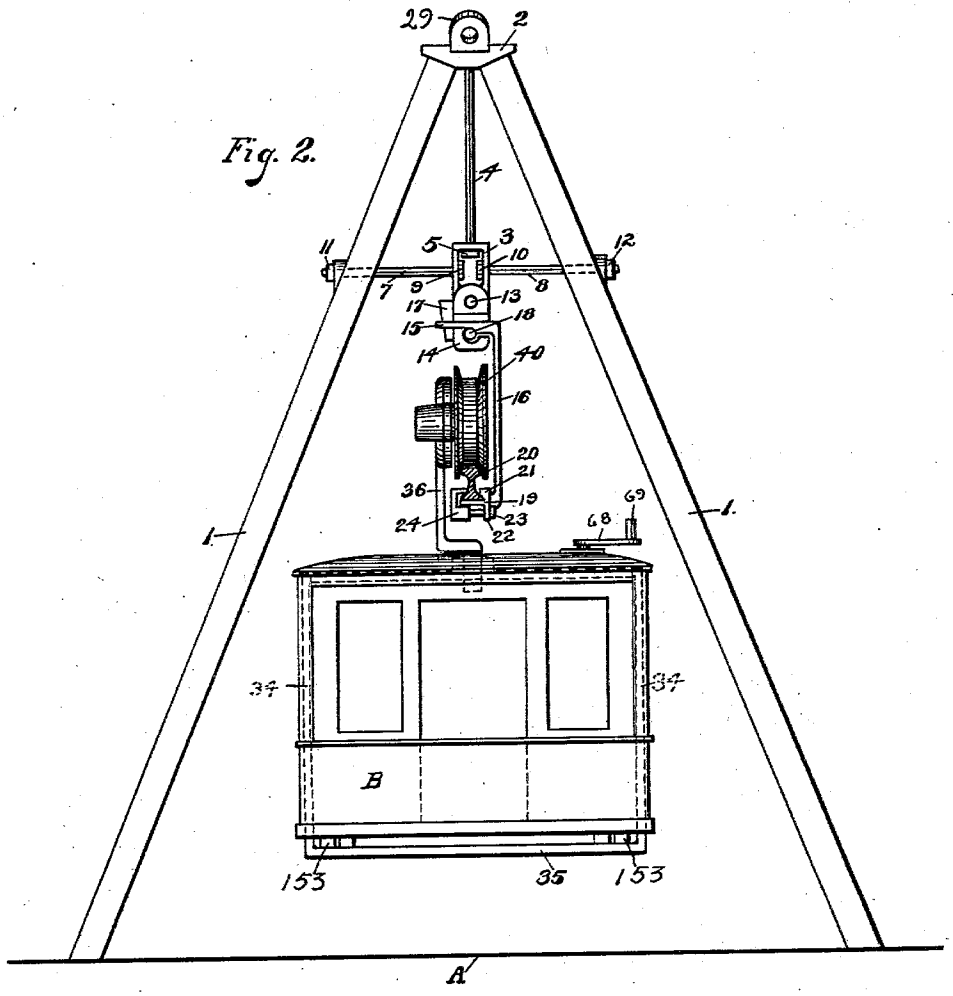
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ELEVATED RAILWAY.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.




WITNESSES:

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NO MODEL. 5 SHEETS—SHEET 3.

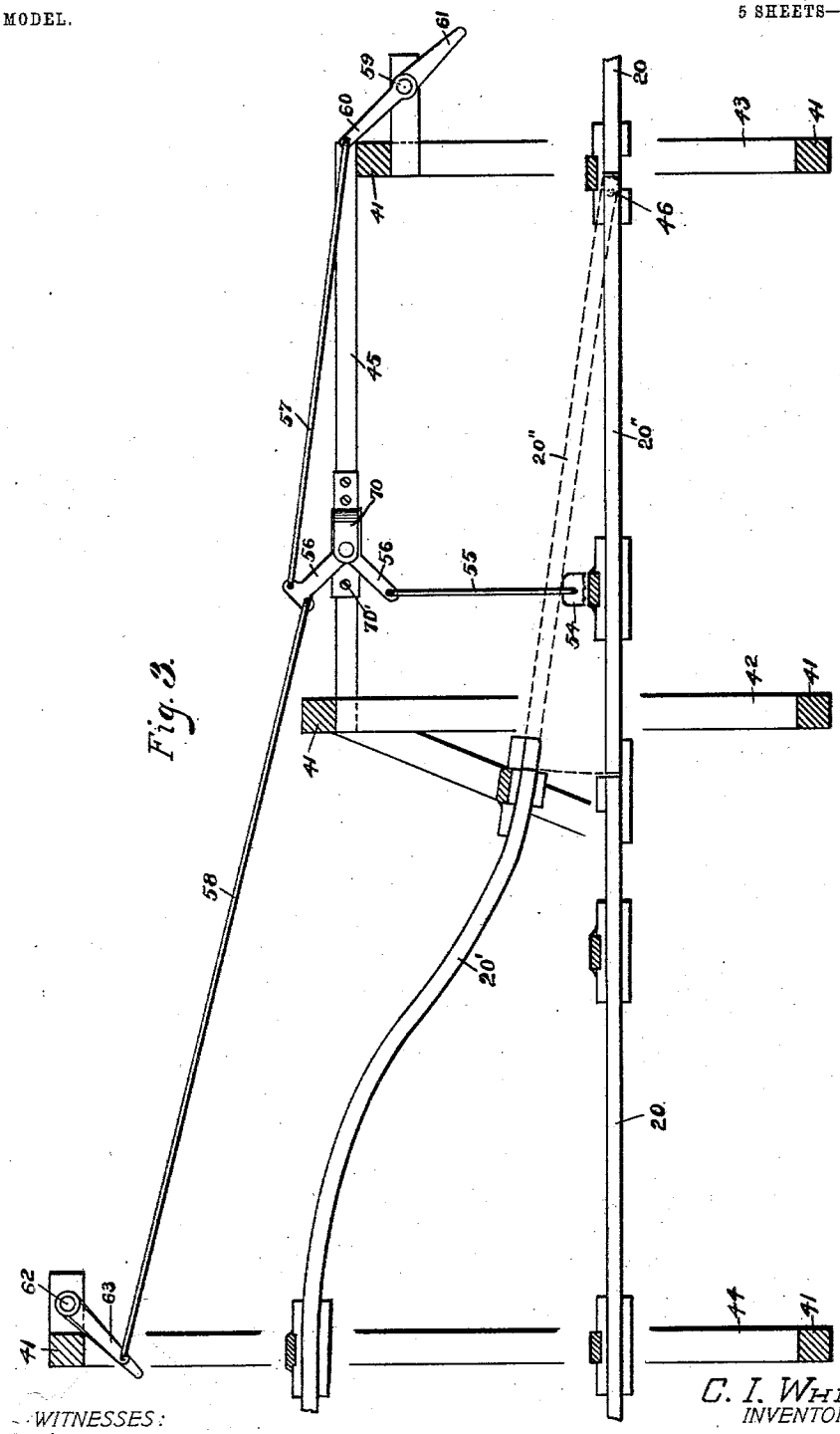



Fig. 3.

WITNESSES:

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No. 743,786. PATENTED NOV. 10, 1903.

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ELEVATED RAILWAY.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 5 SHEETS—SHEET 4.

Fig. 4.

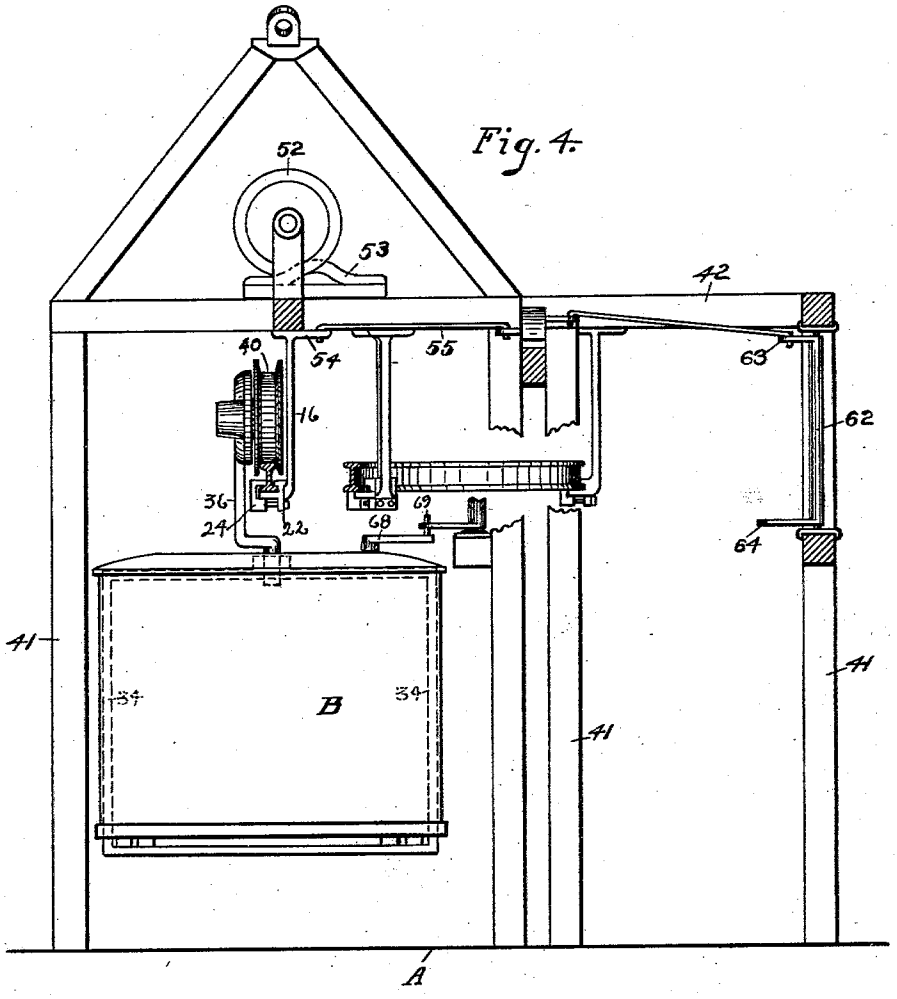



Fig. 5.

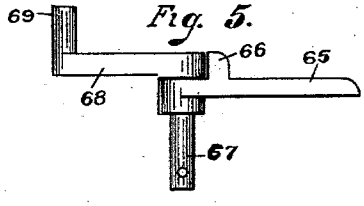
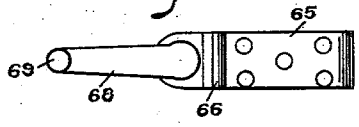



Fig. 6.




WITNESSES:

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No. 743,786. PATENTED NOV. 10, 1903.

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ELEVATED RAILWAY.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 5 SHEETS—SHEET 6.

Fig. 7.

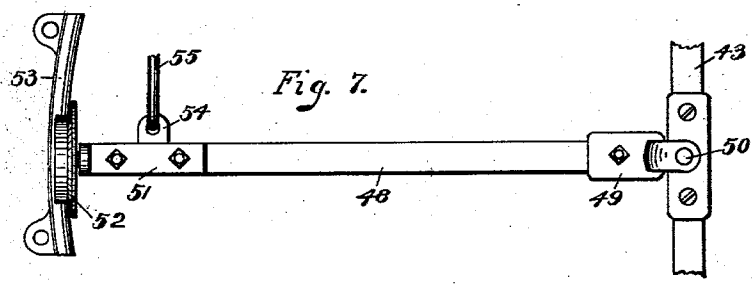



Fig. 8.

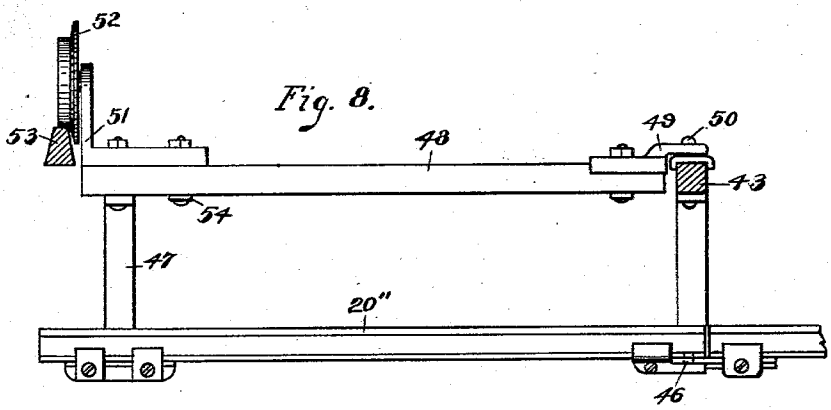



Fig. 9.

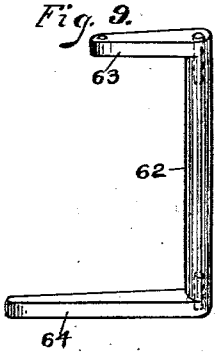



Fig. 10.

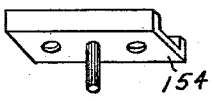



Fig. 11.

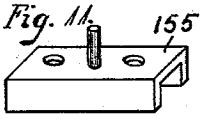



Fig. 12.

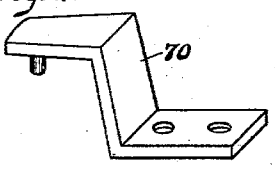



Fig. 13.

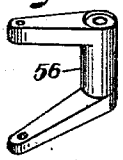
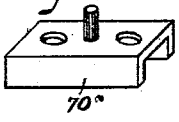



Fig. 14.




WITNESSES:

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No. 743,786. Patented November 10, 1903.

# UNITED STATES PATENT OFFICE.

CASSIUS I. WHITE, OF NOTTINGHAM, INDIANA.

## ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 743,786, dated November 10, 1903.

Application filed June 15, 1903. Serial No. 161,506. (No model.)

*To all whom it may concern:*

Be it known that I, CASSIUS I. WHITE, a citizen of the United States, residing at Nottingham, in the county of Wells, and in the State of Indiana, have invented certain new and useful Improvements in Elevated Railways, of which the following is a specification, which when taken in connection with the accompanying drawings, forming a part thereof, is sufficiently clear and concise as to enable others skilled in the art to which it appertains to make and use the same.

My present invention contemplates a radical reconstruction of the constituent elements of railways, combined with new devices and operations and with mechanical movements and the adoption of old principles with their mechanical elements and operations reduced to their simplest propositions, and as a natural sequence accentuating the utilitarian residual benefits and adapting them to subserve the highest economic ends.

In this present invention my object, broadly speaking, is the provision of a railway system composed of a minimum of mechanical elements adapted to subserve the highest economic ends with a minimum of power applied, and that at a reduced cost of construction and maintenance.

Another object of my invention, generically speaking, is to provide a railway system which will be neat, artistic, and attractive in appearance, compact and symmetrical in proportions, strong and durable in construction, positive in action, capable of a wide scope of usefulness and efficiency, and to facilitate and minimize the labor of the operator.

Another object is the provision of a railway system composed of coöperating and interdependent elements so arranged and combined as to produce the best results, and at the same time adapting it to perform its work more rapidly than has heretofore been attained.

A more specific object is to provide a single-rail elevated railway, thereby reducing the cost of construction and operation, reducing to a minimum the fractional friction, dispensing with the necessity of cuts, fills, and grade-crossings, and allowing for the land adjoining and beneath the roadway to be utilized for other purposes.

Another object is to provide a railway especially adapted for intramural and pleasure purposes, affording means for an extended view from the cars thereof, and effecting means for rapid transportation for pleasure or profit.

Another object is to provide a single-rail elevated railway in which ample and novel automatic switching facilities are provided, with means for controlling the operation of the switches from within the cars and without the necessity of stopping the cars therefor.

Other objects and specific advantages of my invention will appear from the following specification, from the accompanying drawings, and as colligated in the claims hereunto appended.

In carrying out the general objects referred to by the construction and arrangement constituting the present invention I arrange the various devices and the several essential elements in approximately—that is, substantially—progressive succession to provide a generally level track, with the number of grades and cut-outs reduced to a minimum, carrying and supporting the track upon a series of derricks or supports with ample foundations, and, further, supporting the track by a cable and a novel series of braces, with new and novel means for automatically switching the cars from the main track to a siding, and vice versa.

The distinctive features of my present invention, briefly stated, consist of a series of substantial derricks carrying a cable, the cable for supporting the single rail and for equalizing the pressure which may be thereon, a series of novel compensating braces for connecting the derricks and supporting the cable and rail, novel automatic switches, and the means for controlling the switches from within the cars.

The preferred form of my invention will be fully understood and its operation easily comprehended by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a section of my railway, showing a car in operative position in connection therewith. Fig. 2 is an end elevation of my railway and car, taken at right angles to Fig. 1. Fig. 3 is a top plan

view of a portion of my switch and the switch-operating mechanism. Fig. 4 is an end elevation in section taken through the switch. Fig. 5 is a detail elevation of the switch-operating lever and the plate therefor to be attached to the top of the car. Fig. 6 is a top plan of the same. Fig. 7 is a detail top plan of the switching-arm, and Fig. 8 is a side elevation of same. Fig. 9 is a detail view of one of the switching arms or fingers, while Figs. 10 and 11 are detail perspective views of the upper and lower bearings therefor, respectively. Fig. 13 is a detail perspective view of one of the bell-cranks, while Figs. 12 and 14 are detail perspective views of the upper and lower bearings therefor, respectively.

Similar reference characters refer to and denote like parts throughout the several views.

With all of the above-named views in mind I will now take up the description of my invention in detail, in which I will refer to the various parts as briefly and compactly as I may.

In the drawings the letter A designates the ground or earth line, and B a passenger-car adapted to be carried on my railway.

Ordinarily my railway is carried on a series of inverted-V-shaped derricks, as shown in Fig. 2, consisting of the posts 1, anchored in the ground A on suitable foundations of concrete and stone or the like, the posts 1 converging toward the top and connected at their apex by a cap-plate 2, having eyes 29 for the purpose hereinafter stated. Suspended between the upper portions of the derrick thus formed is a buckle 3. Through the upper side of the buckle 3 is an opening to receive the bolt 4, whose head 5 is inside of the buckle 3 and whose threaded end projects through a hole in the center of the plate 2, on which threaded end is screwed the nut 6. In each side of the buckle 3 are openings to receive the inner ends of the bolts 7 and 8, whose heads 9 and 10 are inside of the buckle 3 and whose threaded ends project through holes in the posts 1, on which threaded ends are screwed the nuts 11 and 12, substantially as shown in Fig. 2. The lower end of the buckle 3 is somewhat enlarged, with an opening therethrough to receive the pivot 13 horizontally.

The numeral 14 represents a clamp member with ears extending up therefrom on each side of the lower portion of the buckle 3. Holes are formed through said ears through which the pivot 13 may be inserted and by which said member 14 is pivoted to the buckle 3, thus allowing the lower end of the member 14 to have horizontal swing sidewise. Located horizontally through the member 14 below said pivotal connection is a slot to receive the finger 15 of the hanger 16, and in the outer end of the finger 15 is an opening to receive the wedge 17.

The numeral 18 represents a cable or the like, which connects all the derricks, said cable being laid in the trough of the lower portion of the member 14, the finger 15 being then inserted in the slot in the member 14 and secured by the wedge 17, thus securely holding the cable 18 from accidental displacement, yet allowing it to have an endwise movement for equalizing and compensating for the strain thereon. The lower ends of the hangers 16 have an inwardly-extending flange forming a rail-chair 19, on which rests the T-rail 20. A lug 21 extends from the hanger over the inner flange of the rail, as shown. The rail 20 can be laid in the chair 19 with its lower inner flange secured by the lug 21. Extending down from the base of the chair 19 is a flange 22 with horizontal holes therethrough to receive the bolts 23.

The numeral 24 represents a block with upper lugs adapted to engage the outer flange of the rail 20 similar to the lug 21 and is secured in engagement with the rail by bolts 23 passing through its lower portion beneath the rail. Thus by tightening the bolts 23 the rail is clamped and secured on the chair 19, as shown in Fig. 2.

At a considerable distance apart the cable 18 is provided with a turnbuckle 150, as in Fig. 1, whereby the cable may be tightened or loosened and by which the cable is spliced at convenient points.

Between each two of the derricks the rail and cable are connected and supported by hangers 25, similar in all respects to the hangers 16 except that their upper ends are provided with eyepieces 27 and 28. In the cap-plate 2 are similar eyepieces 29, above referred to. The hangers 25 are connected to the eyepieces 29 by the rods 32 and 33, as shown in Fig. 1. Heads are formed on each end of said rods to engage the respective eyepieces, or one end of each rod may be threaded and provided with a nut in place of that head. Intermediate of the rods are turnbuckles 151 and 152, whereby said rods may be lengthened or shortened, as required for taking up slack or leveling the track. Between each derrick and the hanger 25 the rail and cable may be connected by an additional hanger similar to the hanger 25, if desired.

Extending vertically through the sides of each end of the car B are the shafts 34, extending inward and meeting in the center of the top of the car and extending across underneath the car, forming the cross-bar 35, with the springs 153 disposed between them and the bottom of the car, thus forming a frame at each end of the car which encircles the car, as shown, and in which frames the car is carried. After uniting in the center of the top of the car the shafts 34 are turned to one side a slight distance and then extend upward, forming the arm 36. On the upper end of the arm 36 is secured the short horizontal shaft 37, on which is permanently pivoted the diamond frame 38. The outer ends of the frame 38 carry horizontal axles 39, on each of which is revolubly mounted a ball-bearing channel-

wheel 40, which wheels 40 are adapted to straddle and travel on the head of the T-rail 20, substantially as shown in Fig. 2. One set of the trucks thus formed is mounted above and to each end of the car B in the manner described and as shown in Fig. 1. The shafts or frames 34 are not secured to the car, but are free to move vertically or backward and forward in turning the car, thus allowing a flexibility to the working parts.

The above is substantially a broad description of each of the derricks and also of the main track except at the terminals and switches. In the operation of switching I have provided a novel mechanism, which I will now describe.

In this construction the car traveling in one direction is always expected to take the switch when switching is necessary, and the car traveling in the opposite direction will always keep on the main track. The switch-track is represented by the numeral 20′, which is suspended to hangers similar to the main track and on a level therewith. A section of the main track is movable laterally at one end for switching purposes at each end of the switch and is termed the "movable" rail and is represented by the numeral 20″. For the purpose of supporting the switch I modify the construction of the derricks described by providing vertical posts (represented by the numeral 41) with horizontal cross members 42, 43, and 44, with suitable members, as 45, connecting them, as in Fig. 3, in which view only one-half of the switch is shown, to opposite end of the switch, being similar in construction to that shown, except being oppositely disposed. The outer end of the movable rail 20″ is pivoted by the vertical pivot 46 in order that its inner end may be moved laterally, as indicated by the dotted lines in Fig. 3. The switch-rail 20″ is suspended similar to that of the main track 20 and is adapted to coincide with the ends of either the main rail 20 or the switch 20′, as indicated in Fig. 3, by a novel mechanism which I will now describe. Above the rail 20″ and connected thereto by the hanger 47 is the arm 48, whose outer end is pivoted to the member 43 by the member 49 secured to the arm 48 and the stud or bolt 50 in the top of the member 43, which bolt 50 is immediately above the pivot 46. On top of the inner end of the arm 48 is secured the hanger 51, with a wheel 52 mounted vertically on its upper point, as shown. Secured on the member 43, between and above the ends of the rails 20 and 20′, is the track 53, sloping from the center downward, on which track travels the wheel 52, as indicated. It will now be apparent that the wheel 52 will by this arrangement rest normally at one end or the other of the track 53 and by which the inner end of the rail 20″ will be positively in alinement with the end of one or the other of the rails 20 or 20′. Extending out from the under side of the inner end of the arm 48 is an eyepiece 54, in which is pivoted one end of the rod 55. Mounted on the member 45 is the bell-crank 56, pivoted by the hangers 70 and 70′, into the inner arm of which is pivoted the other end of said rod 55, Fig. 3, and in the other or outer arm of the bell-crank 56 are pivoted one end of each of the rods 57 and 58. Extending out from the right-hand end of the member 44 are upper and lower hangers 154 and 155, carrying the vertical shaft 59, with an upper arm 60, in which is pivoted the rod 57, and a lower arm 61, by which the shaft may be oscillated. Extending out from the right-hand end of the member 44 are upper and lower hangers, as 154 and 155, carrying a vertical shaft 62, with an upper arm 63, in which is pivoted the rod 58, and a lower arm 64, by which the shaft Y W may be oscillated.

On the right-hand side of top of the car is secured the plate 65, with a shoulder 66 extending thereacross, and immediately in front of said shoulder is a round opening to receive the shaft 67, carrying on its upper end the arm 68, provided with an upturned finger 69, as shown in detail in Figs. 5 and 6. A handle or crank C is secured to the lower end of the shaft 67, which crank is within reach of the operator of the car, whereby the shaft 67 may be turned to cause the arm Y I and the finger 69 to extend directly ahead or, as in Fig. 6, to be turned at right angles to the right, as in Fig. 4.

Any suitable power may be employed to propel the car—such, for instance, as electricity, in which instance the motor may be mounted on or in the top of the car and be connected to revolve the wheels 40 in any well-known preferred manner. The power may be drawn from a supply-wire suspended to and within the derricks and be connected to the motor by a suitable trolley in any manner desired.

Referring now particularly to Fig. 3, the operation of the switch will be understood, in which the car desired to be shunted would be coming from the right on the track 20, the arm 68 being turned to the right by the operator, in which case the finger 69 would strike the arm 61 and by the mechanism described the rail 20″ would be carried over to the point shown by the dotted lines, and the car would thus be conducted onto the switch 29′ over the rail 20″, the car continuing to travel on the rail 20′, when the finger 69 will engage the arm 64, which would cause the rail 20″ to be returned into alinement with the main rail 20. After the car traveling in the opposite direction has passed on the main rail 20 the car on the switch will continue in its former direction, when the arm 69 will engage the arm similar to the arm 61, which will connect the switch-rail 20″ of the opposite end of the switch with the main track in same manner as when entering the switch, and after the car has entered on the main track the arm 69 will engage an arm similar to the arm 64, which will close that end of

the switch in a manner similar to that described. When the arm 68 is left pointing straight ahead, as in Fig. 5, it is apparent that the car will not be shunted, but if the arm 68 be turned to the right the car will be shunted at the first switch met with thereafter, and the switches will be automatically opened ahead of the car and closed after it has passed without attention from the operator other than to move the arm 68, as above described.

From the above description, taken in connection with the accompanying drawings, it will be seen that I have produced an improved elevated railway embodying the objects elsewhere referred to in this specification, and while I have illustrated and described the best means now known to me for carrying out the objects of my invention I wish it to be understood that I do not restrict myself to the exact details of the construction shown and described, but hold that any slight changes or variations in such details as would suggest themselves to the ordinary mechanic would clearly fall within the limit and scope of my invention.

Having now fully shown and described my invention and the best means for its construction and operation to me known at this time, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a single rail suspended from a series of derricks, the hangers having chairs for supporting the rail, a cable parallel with and above the rail also carried by said hangers, buckles for carrying the hangers, bolts for holding the buckles in position in the derrick, and turnbuckles in the cable and supporting-rods for the purposes set forth, all substantially as shown and described.

2. The combination in a single-track elevated railway, of a series of derricks carrying in suspension a T-rail, a cable above and parallel with the track, means for suspending the track and the cable by hangers, and a series of braces for supporting the track and the cable intermediate of the derricks, substantially as set forth.

3. In an elevated railway, the combination of a series of derricks and a cable carrying in suspension a single T-rail, of a car with trucks on the top thereof mounted revolubly on horizontal shafts, a frame extending down from the trucks and surrounding the car with springs between its base member and the bottom of the car whereby the car is suspended from said trucks, substantially as described.

4. In an overhead railway system having in combination a series of inverted-V-shaped derricks carrying in suspension a continuous length of T-rail and a cable above the rail, hangers for supporting the rail at frequent points, braces for supporting the rails between the derricks, switches provided at the side of the main track, cars with trucks mounted thereon, channel-wheels revolubly mounted in said trucks and adapted to travel on said track, an arm operative from within the car adapted to contact with arms to open and close the switches when the car is in motion, all substantially as shown and described.

5. In an overhead railway system having in combination a series of derricks carrying in suspension a continuous length of T-rail and a cable thereabove, hangers for supporting the rail at frequent points, switches located at the side of and on a level with the main track with the ends of the switches adapted to be brought into alinement with and abutting the adjoining sections of the main track, laterally-movable sections of the main track adapted to be brought into alinement with the ends of the switches, means for operating said movable sections of the main track by the movement of a car traveling on the rails, and means for controlling the action of the switches by the operator of the car, all substantially as shown and described.

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

CASSIUS I. WHITE.

Witnesses:
R. W. RANDLE,
R. E. RANDLE.