(No Model.) 3 Sheets—Sheet 1.

E. L. ARNOLD.

ELEVATED RAILROAD.

No. 476,720. Patented June 7, 1892.

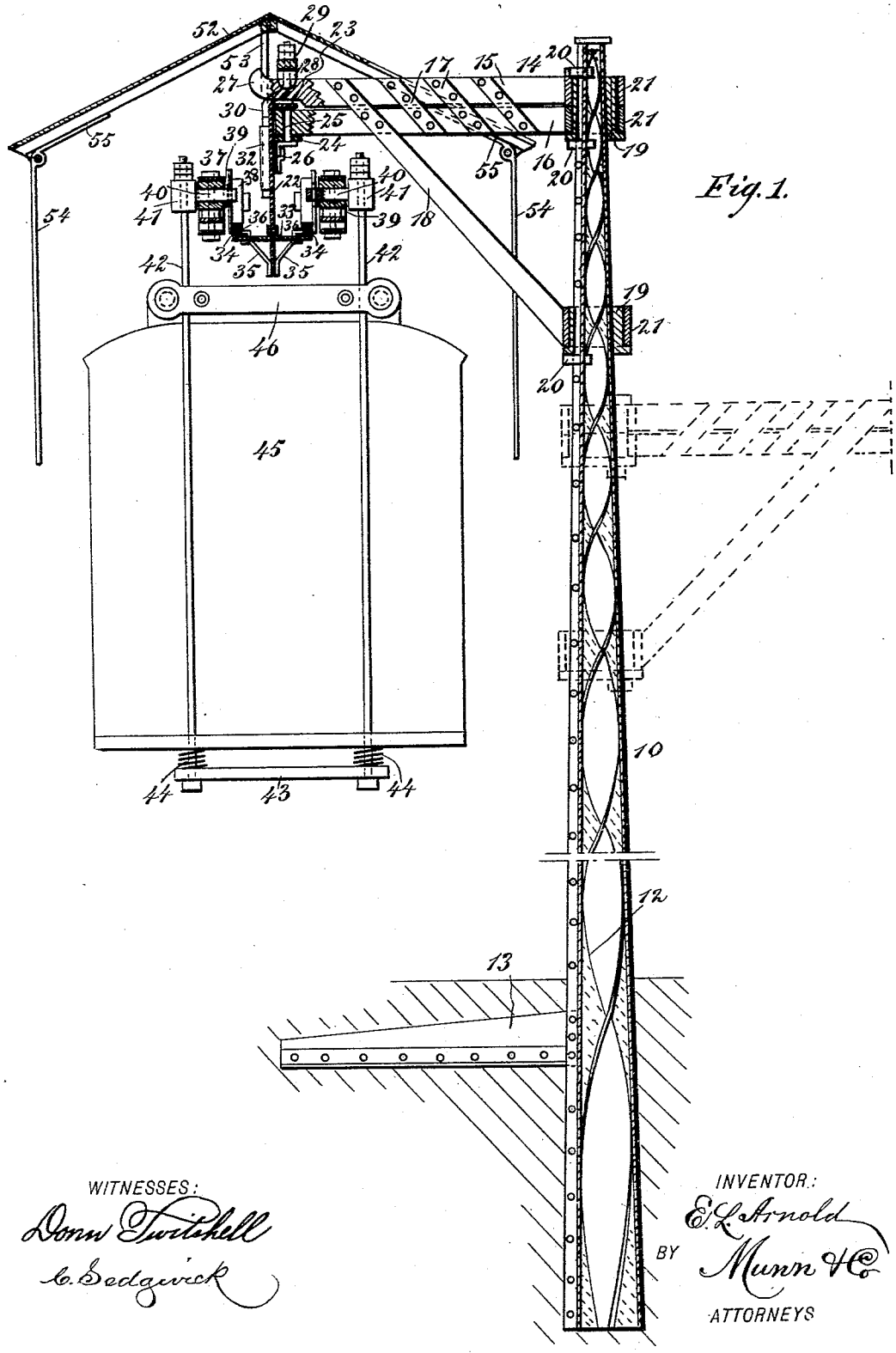

Fig. 1.

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Fig. 2.

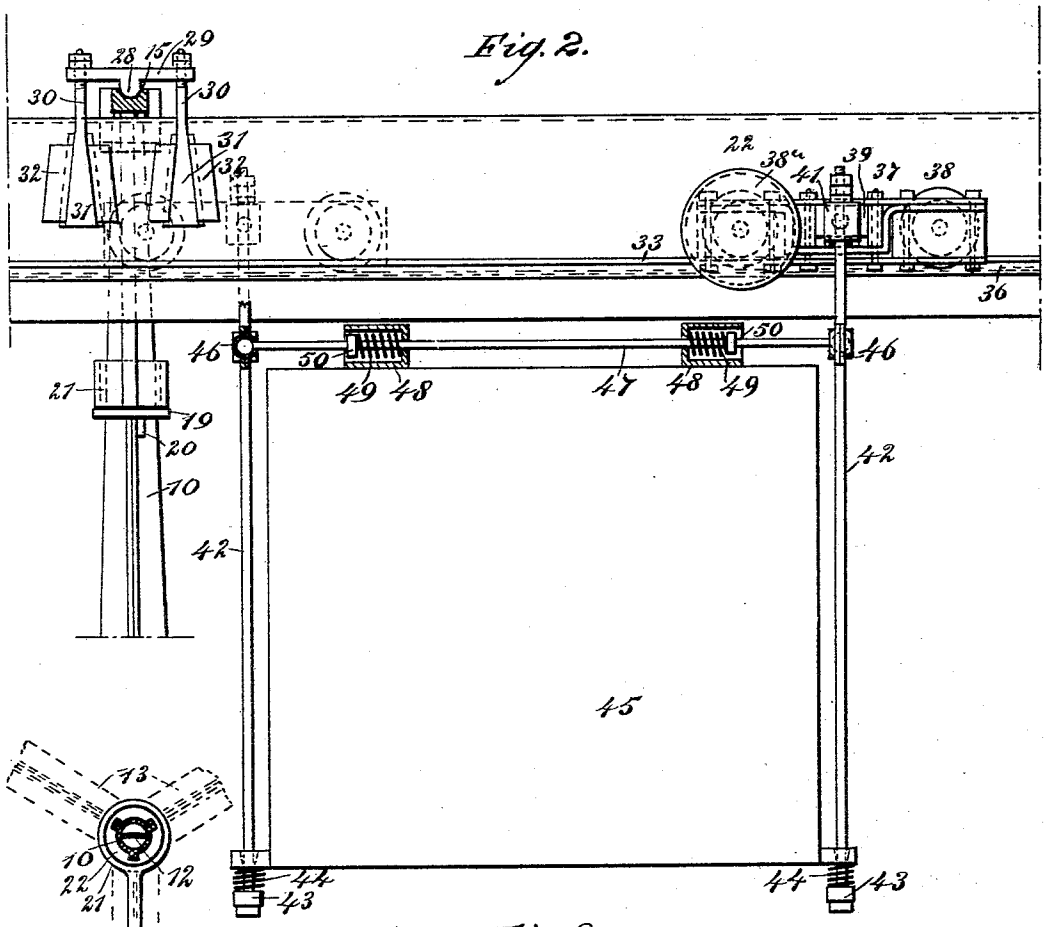
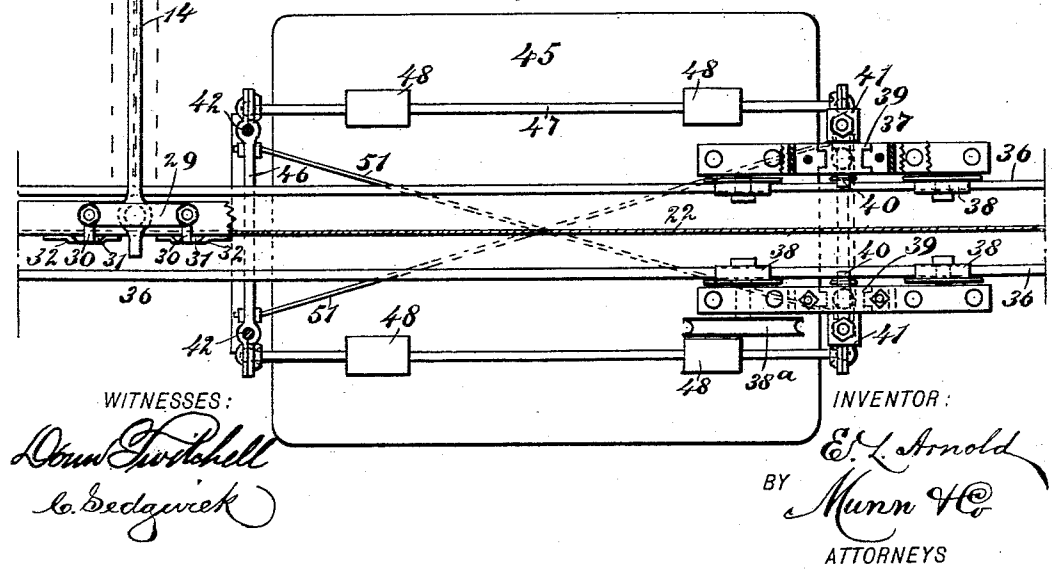


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

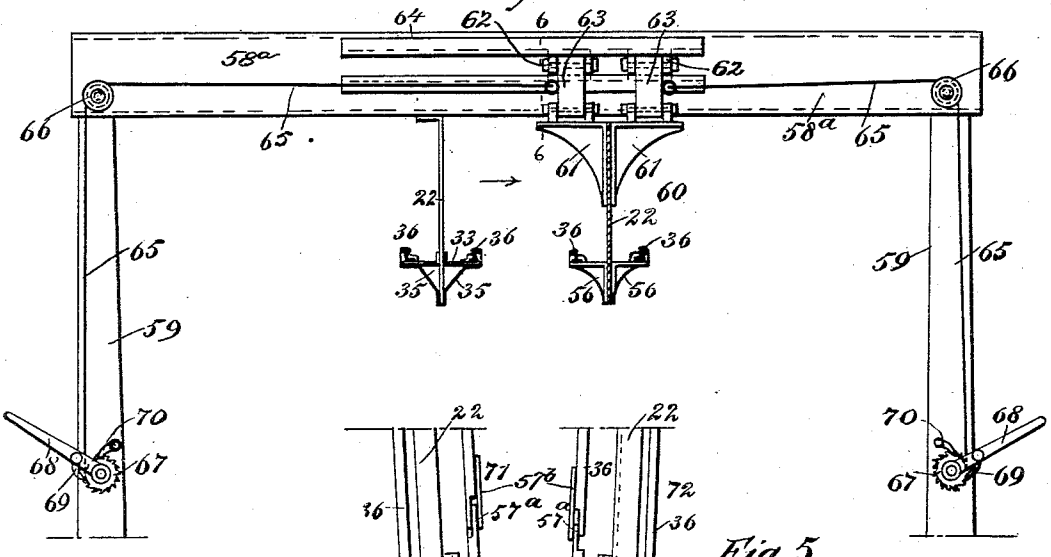


Fig. 5.

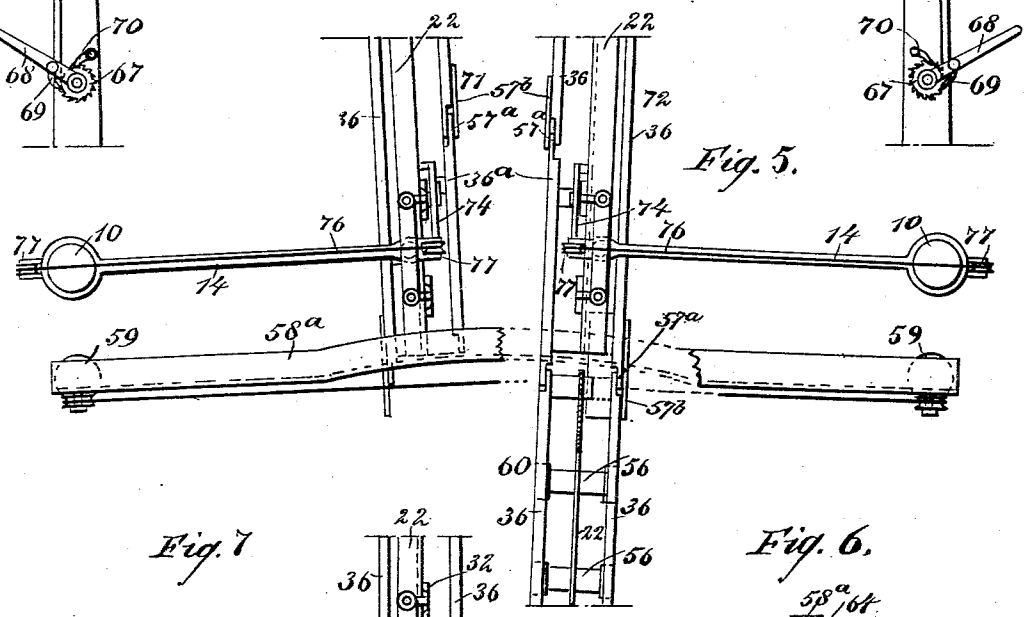


Fig. 7

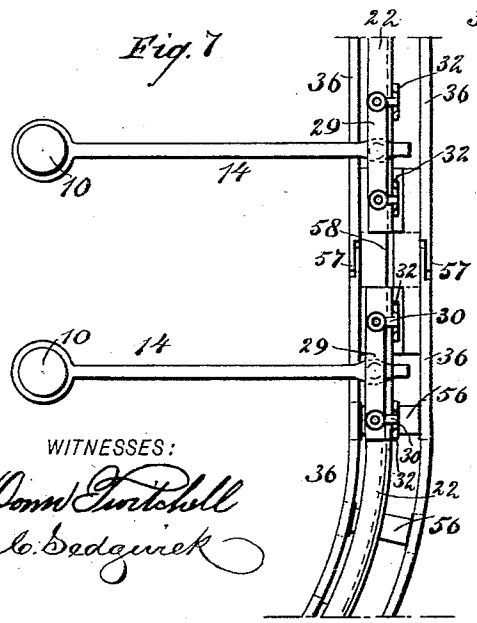
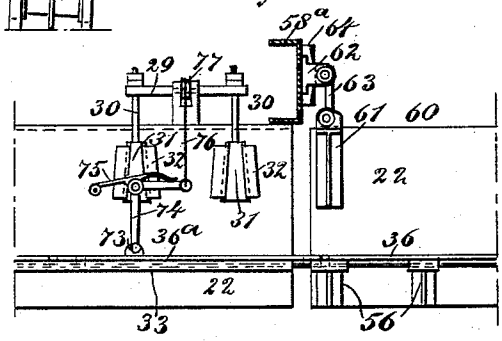


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ELIPHALET L. ARNOLD, OF GEORGETOWN, TEXAS.

ELEVATED RAILROAD.

SPECIFICATION forming part of Letters Patent No. 476,720, dated June 7, 1892.

Application filed May 26, 1891. Serial No. 394,120. (No model.)

To all whom it may concern:

Be it known that I, ELIPHALET L. ARNOLD, of Georgetown, in the county of Williamson and State of Texas, have invented a new and Improved Elevated Railway, of which the following is a full, clear, and exact description.

My invention relates to improvements in elevated railways; and the object of my invention is to produce an elevated-railway system which is comparatively cheap, which is absolutely safe, and in which the cars are arranged so that they ride very easily and can be readily adapted for both passenger and freight traffic.

To this end my invention consists of an elevated railway constructed substantially as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a vertical cross-section through the railway and its connected parts. Fig. 2 is a broken longitudinal section. Fig. 3 is a sectional plan. Fig. 4 is a detail cross-section showing the arrangement and construction of the switches used in the railway. Fig. 5 is a broken sectional plan of the switch. Fig. 6 is a vertical section on the line 6 6 in Fig. 4, showing in detail the mechanism for operating a sliding rail used in connection with the switch; and Fig. 7 is a broken detail plan view showing the manner in which the railway is constructed at a curve and showing, also, the provision for expansion and contraction.

The railway is supported on a series of vertical posts 10, which posts are made up in sections and are made hollow. Each post is provided with a strip 12, which extends spirally through it, and radiating from the lower portion of each post are arms 13, which are also hollow and which are adapted to be embedded in the earth, and it will thus be seen that the arms will prevent all lateral movement of the post. The post may be embedded in masonry, if desired, and after the posts are planted they are filled up with sand, gravel, or cement, thus making them absolutely rigid. Each post is provided at its upper end with a laterally-extending arm 14, which is adapted to support the track, and the arm 14 is made up of two parts 15 and 16, arranged one above the other, and the parts are united by diagonally-arranged strips 17, thus making them as solid as a single arm. The arm 14 is also provided with a brace 18, which extends from the outer portion of the arm downward to the post 10, and the arm and brace are pivotally mounted on the post, so as to provide for the expansion and contraction of the truss which carries the track, and which will be described below, and the swivel movement of the arm 14 also enables it to adapt itself to any curvature of the track. The arm 14 and brace 18 each rest upon a flanged collar 19, the collars 19 being arranged one above the other and held in position upon the post 10 by suitable keys 20, which are driven into slots in the post. These collars 19 have a circular exterior surface, and the arm 14 and brace 18 are provided with terminal sleeves 21, which rest upon the collars 19, and thus afford a substantial bearing for the arm. The arm 14 supports at its outer end a truss 22, which is preferably made of steel, and this truss is made continuous and formed of a series of short strips, which are firmly riveted together. The lower member 16 of the arm 14 is somewhat shorter than the upper member 15, and the upper portion of the truss 22 is provided with parallel and laterally-extending flanges 23 and 24, which embrace the lower member of the arm and which are pivoted to the arm by a king-bolt 25, which extends upward through the lower flange 24 and into the arm, as best shown in Fig. 1, and the bolt is held in place by means of a cleat 26, which is secured to the truss beneath the flange 24 and which engages a flange on the head of the bolt 25. The upper member 15 of the arm 14 is curved slightly upward at its free end, as shown at 27, and is provided near the end with a concaved seat, which receives a ball 28, which is formed centrally on a cross-bar 29, and this cross-bar is provided at its ends with depending rods 30, which extend downward on each side of the member 15 of the arm 14 and are curved slightly outward, so as to bring them into a position parallel with the side of the truss 22, and the rods 30 are widened and flattened at their lower ends, as shown at 31, and are dovetailed into slideways 32, produced on one side of the truss,

so that the rods will form an additional support for the latter. It will thus be seen that the ball 28 and the socket in the arm 14 form a ball-bearing for the truss, and it will be noticed that as the truss is pivotally suspended from the free end of the arm 14 and the arm is also arranged to swivel on the post 10 the truss will be freely suspended, but will still be held in an absolutely secure position.

The truss 22 is provided near its lower end with a two-part base-plate 33, arranged on each side of the truss and having vertical flanges 34 on its outer edge, the base-plate being strengthened and supported by braces 35, extending from the outer sides of the base-plate to the lower edge of the truss. This base-plate 33 forms a support for the track-rails 36, which are arranged near the outer edges of the plate and which are adapted to support a car. The cars used in connection with this railway are suspended from trucks 37 and are adapted to run beneath the track. Each truck 37 is substantially like an ordinary railway-truck and is provided with wheels 38, which run upon the rails 36 and which are provided with wide flanges, so as to prevent derailment. It will be noticed that the elevation of the tracks enables the flanges of the wheels to be made of any desired width, so that it will be impossible for the wheels to be forced from the track. The trucks 37 are also provided with a driving-wheel 38^a, which is secured to one of the axles and which may be driven by a cable or by any suitable power, and in propelling the car any suitable driving mechanism may be employed, and it may be propelled by electricity, cables, steam, or even by horse-power. In the trucks 37, near the center, are vertically-movable boxes 39, which are suspended upon springs and through which extend bolts 40, said bolts having their outer ends arranged to project beyond the sides of the truck, and these ends terminate in enlarged heads 41, from which a car is suspended. Extending downward through these heads 41 are rods 42, which are connected at the bottom by cross-bars 43, and the cross-bars and rods thus form a hanger, which supports a car 45, and in order that the car may be yieldingly supported springs 44 are introduced between the car-bottom and the cross-bars 43, and the joint effect of the springs 44 and the spring-supported slide-boxes 39 will be to enable the car to ride very easily. The rods 42 are at each end of the car, and they extend upward through yokes 46, which are arranged near the upper portion of the car and which serve to brace the hangers which support the car. These yokes are connected by rods 47, and each rod 47 is provided near the ends with a socket 48, the sockets being arranged to open in different directions. Within each socket is a spring 49, one end of which contacts with the closed end of the socket and the opposite end of which contacts with a collar 50 on the rod 47. It will thus be seen that when the car is suddenly stopped the inertia of the car will cause it to move forward slightly, and the springs 49 will have a buffer action and prevent any violent shock. The yokes 46 are also connected by cross-rods 51, which serve to brace the same, said rods extending above the top of the car. In stopping the car any suitable brake mechanism may be employed, and, if desired, friction may be brought to bear upon the rails.

The track is covered throughout its entire length by a roof 52, which is supported by braces 53, extending from the center of the roof to the truss 22, and depending from the eaves of the roof are metallic curtains or shields 54, which are provided with elongated upper ends 55, which press against the under side of the roof, the shields being thus prevented from blowing inward so as to obstruct the passage of a car.

The object of the roof and shields is to prevent the track from being obstructed by snow, ice, or frost, and also to shield it from the direct rays of the sun, and thus they prevent great expansion and contraction of the rails and of the truss which supports them.

In Fig. 7 I have shown the manner in which the track is carried around a curve, and in the same figure I also show the means for allowing the truss 22 to expand. In rounding a curve the base-plate 33 is dispensed with and braces 56 are secured to the lower sides of the truss and are adapted to support the rails 36. The truss may be easily bent to a desired curvature, and the braces will afford a secure support for the rails. To provide for expansion, the rails are halved together at certain points, as shown at 57 in Fig. 7, and a break is made in the truss, as shown at 58, the adjacent ends of the truss being united by a sliding strip, so as to prevent their displacement.

In Figs. 4 to 6, inclusive, I have shown the switch mechanism. To provide for a switch, a cross-truss 58^a is made to extend above the track and adjacent to posts 10, which are arranged opposite each other and which support two track-sections, and the cross-truss 58^a is provided with a central lateral bend, the bend describing the arc of a circle in which the movable track-section swings, and the truss 58^a is supported by suitable posts 59, extending from each end of it to the ground, and the posts are made substantially like the posts 10, already described. The swinging section of the track 60 is supported from the cross-truss 58^a and is hinged to the main track, said section having the truss 22, provided with braces 61 at its upper edge and on each side, and these braces are pivotally suspended from cross-heads 62 by means of links 63, and the cross-heads are held to slide in a track 64, which is arranged on one side of the truss 58^a, as best shown in Figs. 4 and 6. The truss 22 of this swinging section 60 is also provided at its lower edge with braces 56, which support the rails 36 in the manner already described. The cross-heads

62 are provided with cables 65, the cables being secured to opposite cross-heads, and the cables extend outward over suitable guide-pulleys 66 and downward to a point adjacent to the ground, where they are wound upon drums secured to the posts 59, the drums having ratchet-wheels 67 at their outer ends, which ratchet-wheels are turned by handles 68 and pawls 69 and are prevented from turning back by pawls 70. The fixed sections 71 and 72 of the main track are supported from posts 10 in the usual way at a point opposite the swinging section 60, and this section by moving it in the manner described may be made to align with either of these sections 71 or 72. The inner rails 36^a of the sections 71 and 72 are halved at the ends, as shown at 57^a, and are held to slide longitudinally, so that when the swinging section 60 is brought opposite one of these fixed sections a sliding rail 36^a may be moved longitudinally, so that it will rest at one end upon one of the braces 56, which support the rails of the sliding section, and a safe joint will thus be made, so that a car may run in safety from one section to another. The sliding rails 36^a are held in proper alignment by the guides 57^b, which are arranged parallel with the rails and opposite the joints, and the rails are also provided with the usual chairs, as shown in Fig. 5. This sliding rail 36^a is operated by a bell-crank lever 74 and its connections, the lever being pivoted on the side of the truss 22 above the rail and having its lower arm held in engagement with a lug 73 on the rail, as best shown in Fig. 6, and the bell-crank is held in a position to push the rail 36^a back upon the fixed section by means of a spring 75, which is secured to the truss and presses upon the upper arm of the bell-crank. The upper arm of the bell-crank is provided with a cable 76, which extends upward and outward over guide-pulleys 77 and then downward to connect with a drum and ratchet substantially like that shown in Fig. 4 and described above. It will thus be seen that when the swinging section 60 is thrown to align with one of the fixed sections the rail 36^a may be moved by the lever mechanism above described so as to bring it into its proper position.

From the foregoing description it will be seen that the railway is perfectly safe and simple, and, if desired, the cars may be brought near enough to the ground so that they may be easily entered from the ground and freight may likewise be easily placed in them. I have shown the railway as adapted for passenger or freight traffic on a large scale; but, if desired, the entire mechanism may be made light, and the cars may be propelled by horse or mule power.

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

1. An elevated railway comprising a series of supporting-posts carrying laterally-extending arms which are pivoted on the posts, a supporting-truss pivoted in the free ends of the arms, and rails supported on opposite sides of the truss, substantially as described.

2. An elevated railway comprising a series of posts having laterally-extending arms, a truss suspended from the free ends of the arms, rails supported on opposite sides of the truss, and a roof supported above the truss, so as to cover the track, substantially as described.

3. The combination, with an elevated-railway track, of a roof supported above the track and depending shields supported upon the eaves of the roof, substantially as described.

4. An elevated railway comprising a series of vertical posts having laterally-extending arms pivoted upon their upper ends, a truss pivotally suspended from the free ends of the arms, a base-plate secured to the truss near the lower edge of the same, and rails carried on the base-plate, substantially as described.

5. In an elevated railway, track-supports comprising a series of hollow posts having near the bottom laterally-extending arms and having a central spiral core, and arms pivoted to the upper ends of the posts, said arms having depending braces which are also pivoted to the posts, substantially as described.

6. The combination, with supporting-posts and swinging two-part arms, of a track-carrying truss having near its upper edge parallel flanges to embrace the lower member of the post, a pin extending through the lower flange and into the post, and a ball-joint connection between the truss and the upper member of the arm, substantially as described.

7. In an elevated railway, the combination, with a supporting-arm having a socket in its upper side, of a track-supporting truss having a slideway thereon, rods secured in the slideway and arranged to embrace the supporting-arm, and a cross-bar connecting the upper ends of the rods, said cross-bar having a ball in its under side to fit the socket of the arm, substantially as described.

8. The combination, with elevated track-rails and trucks arranged to run thereon, of spring-pressed slide-boxes supported in the trucks, bolts extending laterally from the boxes, hangers suspended from the bolts, and a car mounted upon springs within the hangers, substantially as described.

9. The combination, with a suspended car and its supporting-hangers, of yokes connecting the side members of each hanger, rods connecting the yokes, sockets carried by the rods, and springs arranged within the sockets and adapted to press collars on the rods, substantially as described.

10. In an elevated railway, the combination, with the two converging fixed sections and with the main line, of a cross-truss supported above the track, a swinging section supported

from the cross-truss, hinged to the main line, and adapted to align with the converging fixed section of the track, and a lever mechanism for moving the swinging section, substantially as described.

11. In an elevated railway, a switch comprising a cross-truss supported upon posts and provided on one side with a track, cross-heads held to slide in the track, a lever mechanism for moving the cross-heads, and a swinging track-section suspended from the cross-heads, substantially as described.

12. In an elevated railway, the combination, with the converging fixed track-sections and the swinging switch-section, of a sliding rail arranged upon each of the fixed sections and a lever mechanism for moving the rail from the ground, substantially as described.

13. In an elevated railway, the combination, with the converging fixed track-sections and the adjacent swinging track-section, of a sliding rail secured upon the fixed track-sections, a bell-crank pivoted above the rail and having one member connected therewith, a cable secured to the opposite member of the bell-crank and connected with the ground, and means for operating the cable, substantially as described.

E. L. ARNOLD.

Witnesses:
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SALLIE W. GLOVER.