No. 667,011. Patented Jan. 29, 1901.

J. W. GONCE.

ELEVATED RAILWAY.

(Application filed July 1, 1899.)

(No Model.) 5 Sheets—Sheet 1.

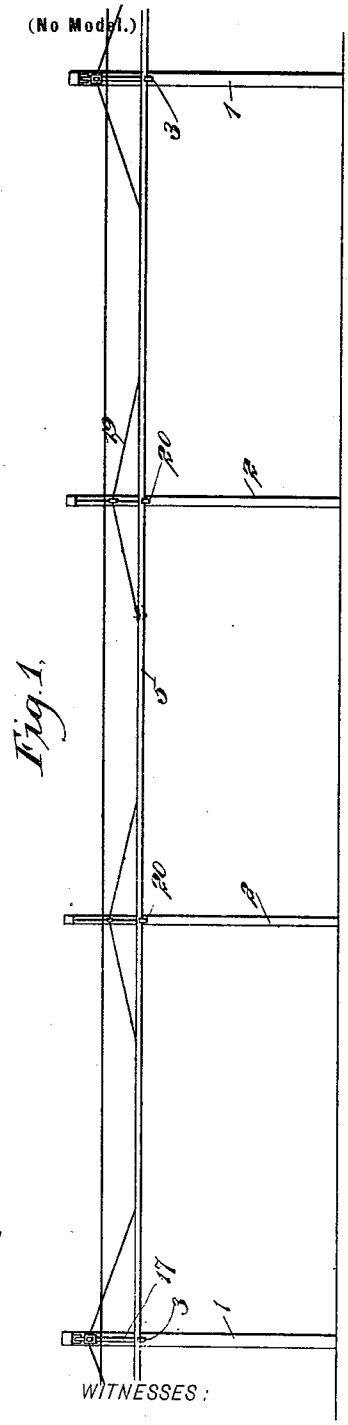

Fig. 1.

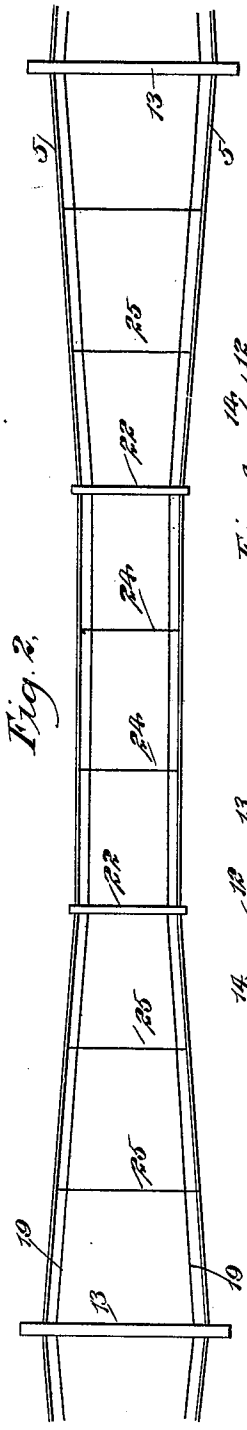

Fig. 2.

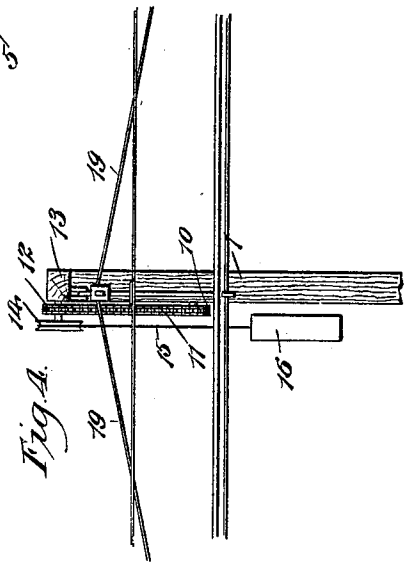

Fig. 4.

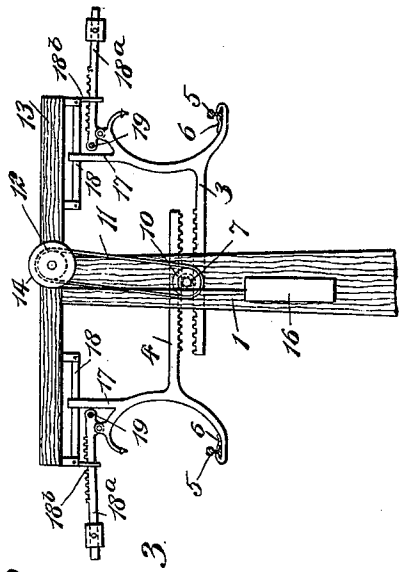

Fig. 3.

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Fig. 9,

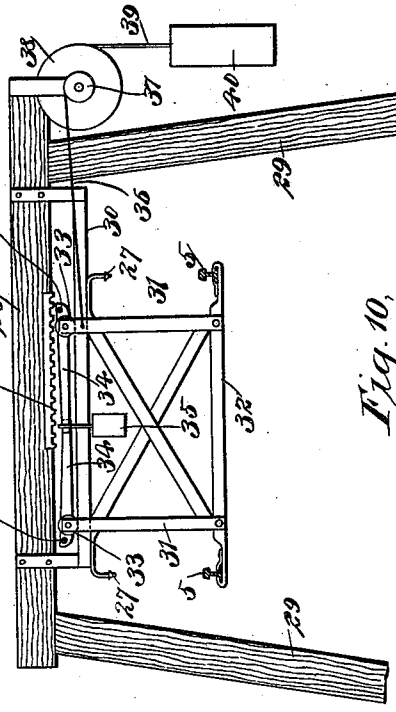


Fig. 10,

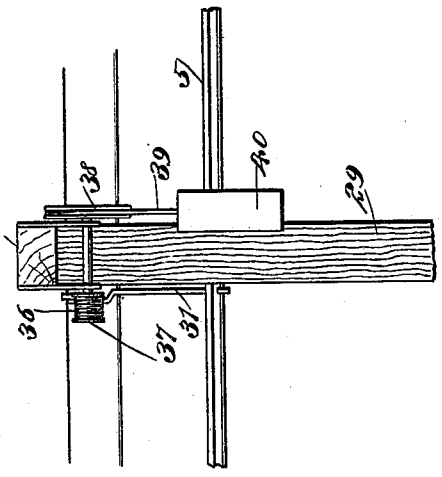


Fig. 6,

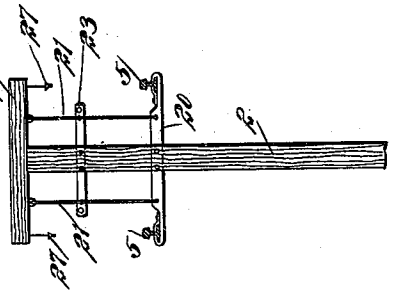


Fig. 4,

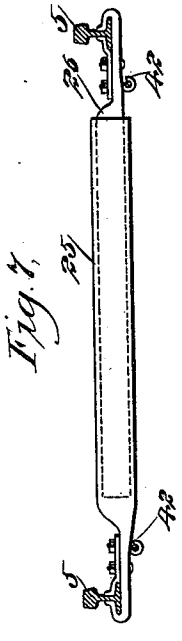


Fig. 8,

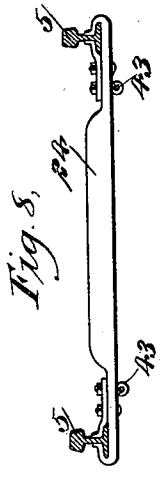
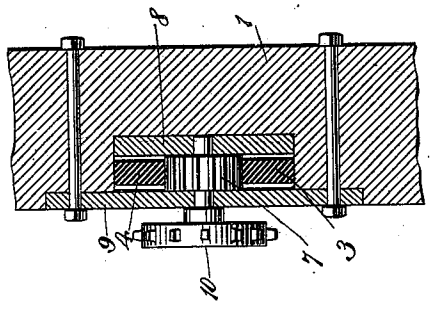


Fig. 5,



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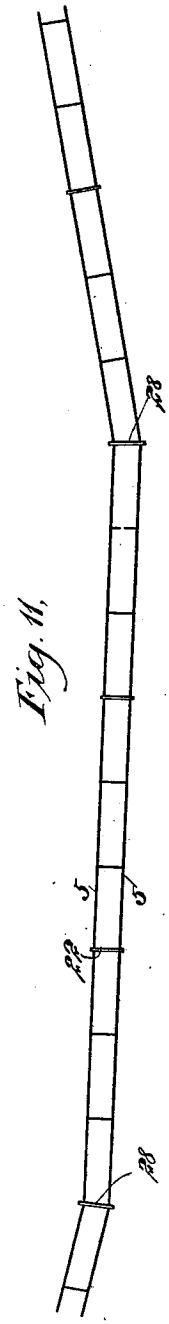

Fig. 11.

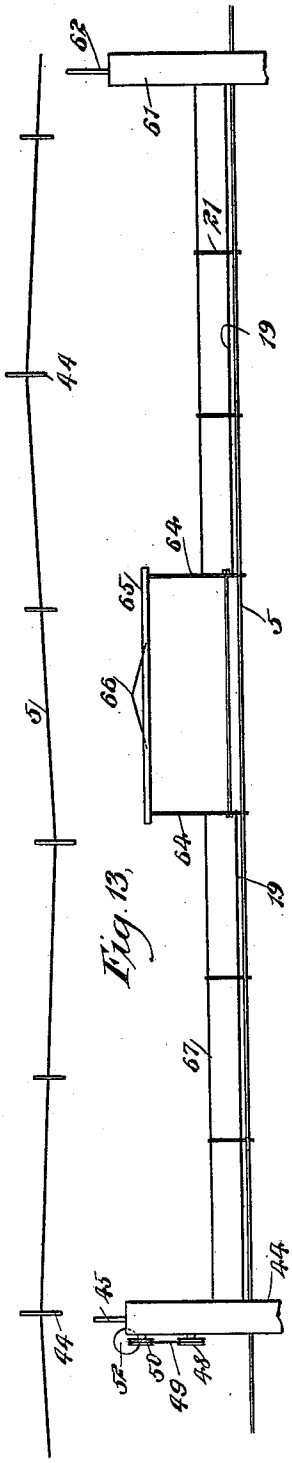

Fig. 12.

Fig. 13.

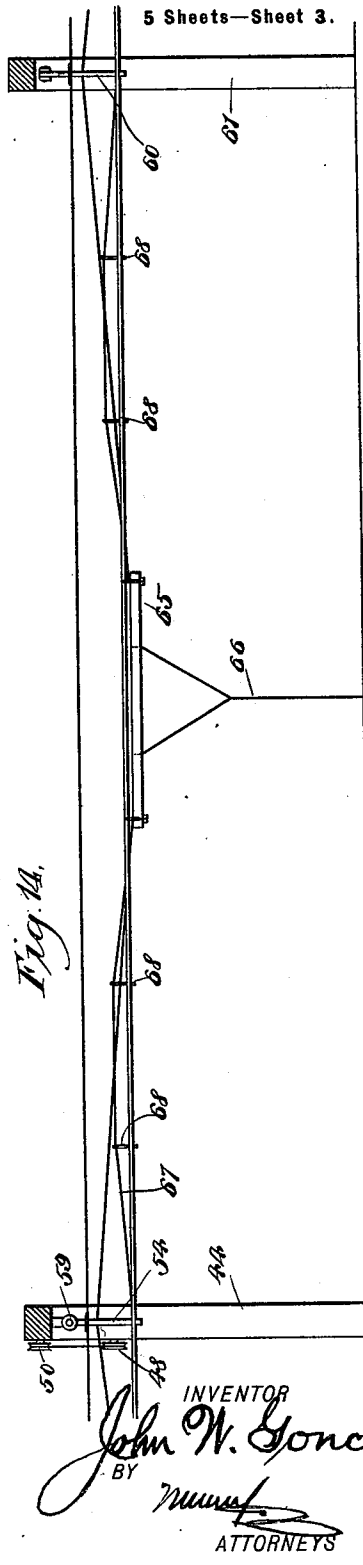

Fig. 14.

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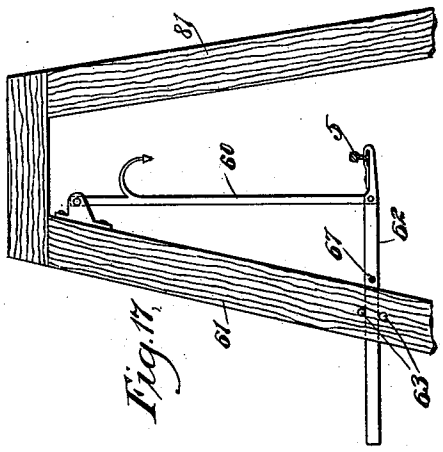

Fig. 17.

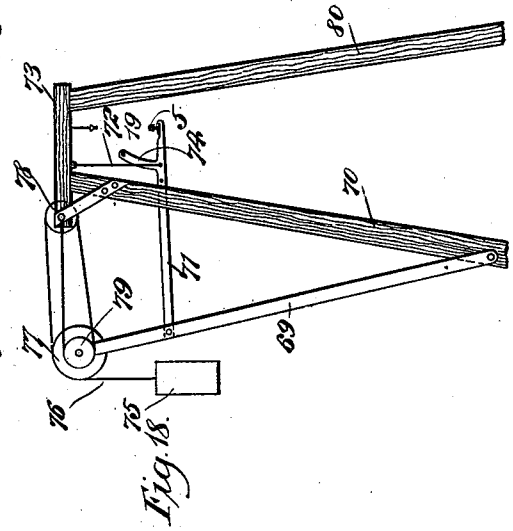

Fig. 18.

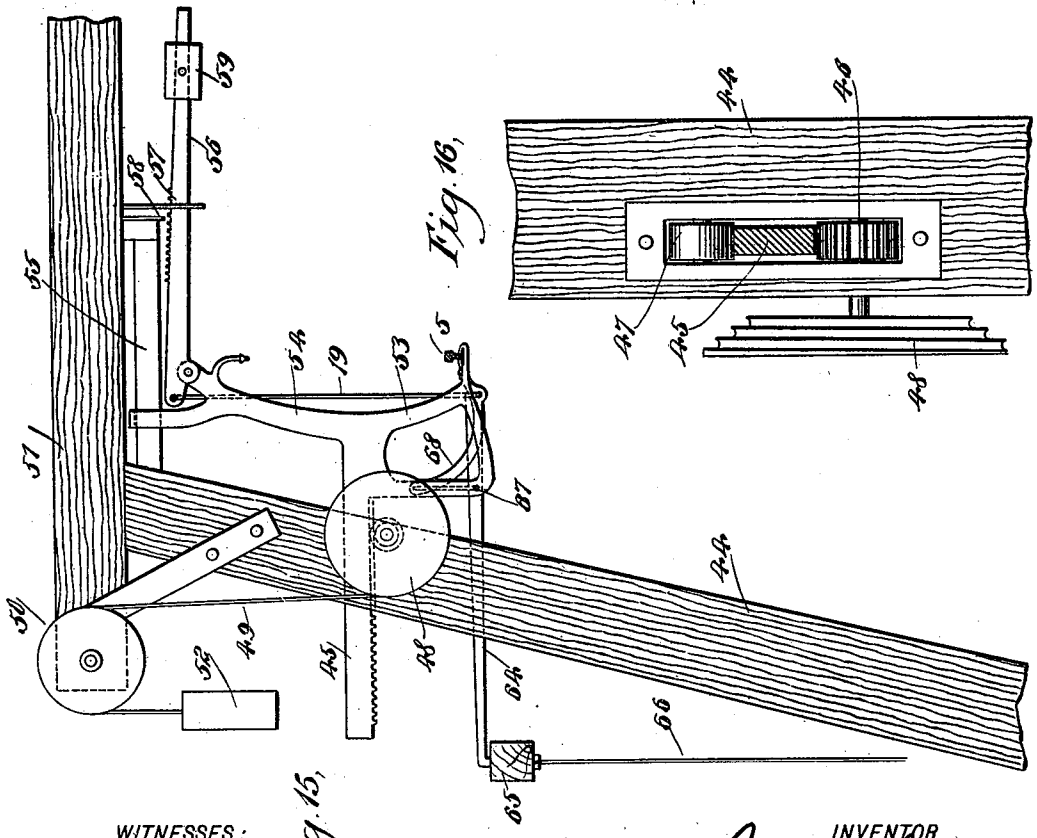

Fig. 15.

Fig. 16.

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(Application filed July 1, 1899.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 20.

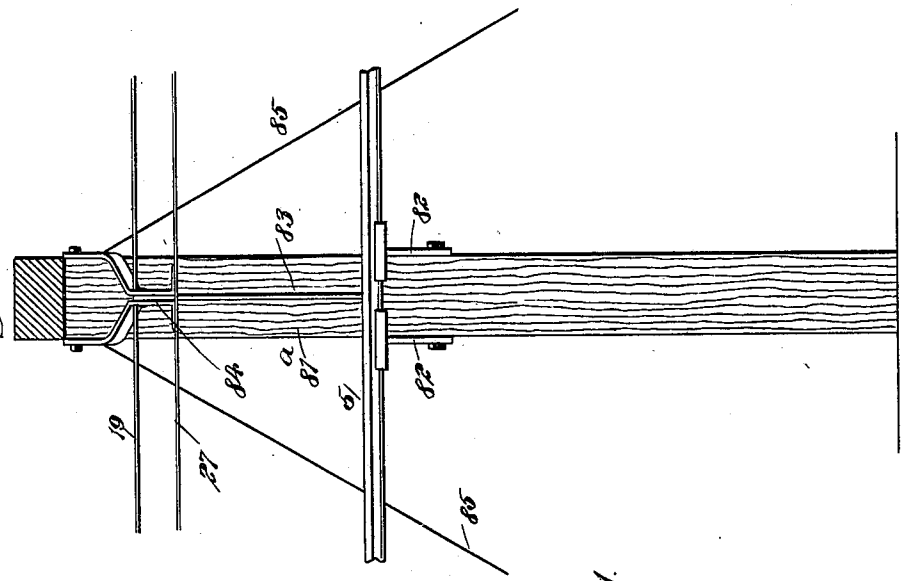


Fig. 19.

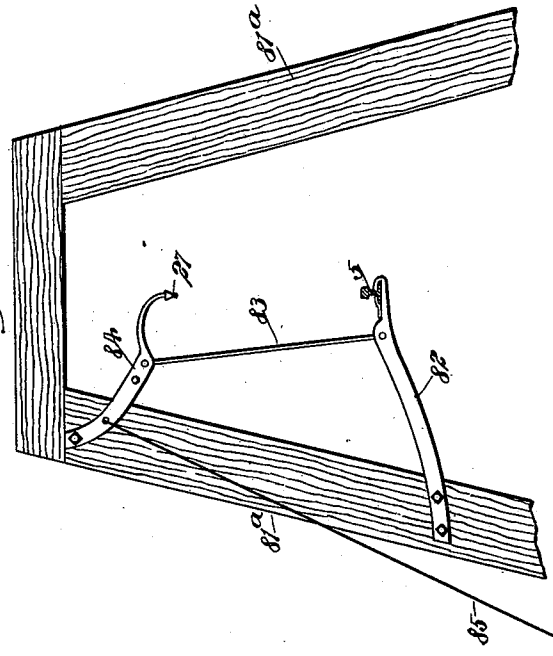
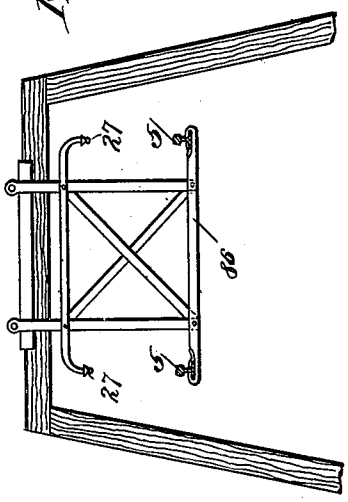


Fig. 21.



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UNITED STATES PATENT OFFICE.

JOHN WISDOM GONCE, OF KINDERHOOK, ALABAMA.

ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 667,011, dated January 29, 1901.

Application filed July 1, 1899. Serial No. 722,555. (No model.)

To all whom it may concern:

Be it known that I, JOHN WISDOM GONCE, of Kinderhook, (near Anderson, Tennessee,) in the county of Jackson and State of Alabama, have invented a new and Improved Elevated Railway, of which the following is a full, clear, and exact description.

This invention relates to improvements in elevated or suspension railways; and the objects are to provide a railway particularly adapted to supply the wants of communities where there is not enough traffic to justify the expense of operating a surface railway of the usual construction; further, to provide a railway that may be cheaply constructed over level or hilly country and that will require very little repair or expense to keep in order, and, further, the railway may be constructed with either single or double tracks and so designed that a uniform tension can be maintained in the tracks and supporting-cable during the varying changes of the seasons. This is effected by deflecting the track laterally at intervals from a straight line.

I will describe an elevated railway embodying my invention and then point out the novel features in the appended claims.

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

Figure 1 is a side elevation of a double-track railway system embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a front view of one of the main supporting-posts employed and the track-adjusting devices thereon. Fig. 4 is a side view thereof. Fig. 5 is a vertical detail showing a portion of the adjusting devices. Fig. 6 is a front view of one of the intermediate supporting devices employed. Fig. 7 shows one form of cross-ties employed. Fig. 8 shows another form of cross-ties employed. Fig. 9 is a front view of a supporting and adjusting mechanism that may be employed at curves in the railway. Fig. 10 is a side view thereof. Fig. 11 is a plan view of the railway as on a curve. Fig. 12 is a plan view of a single-track railway, showing a zigzag arrangement of the spans. Fig. 13 is a plan view showing a modification in a single-track system. Fig. 14 is a side view thereof. Fig. 15 is a front view of a supporting and adjusting mechanism used in the modifications shown in Figs. 13 and 14. Fig. 16 is a side view of a portion thereof, and Figs. 17, 18, 19, 20, and 21 are views of further modified constructions.

Referring first to the example of my invention illustrated in Figs. 1, 2, 3, 4, and 5, 1 designates the main supporting-posts, which may be placed at any suitable distance apart, and intermediate of these posts are the supporting-posts 2. It is to be understood that these posts, as well as certain other posts that are to be hereinafter mentioned, are to be firmly anchored in any suitable manner.

Movable transversely of each post 1 and in opposite directions are rail-supporting arms 3 4, and these arms at their outer ends are adapted to receive the track-rails 5. The ends of the arms are turned over to engage against the outer bottom flanges of the rails, and clips 6 engage with the inner portions of said flanges, the said clips being bolted or otherwise secured to the arms. The arms 3 and 4 have rack portions engaging, respectively, with the upper and lower sides of a pinion 7, seated in a recess formed in the post and here shown as having its inner bearing in a plate 8 in the post and its outer bearing in a plate 9, secured to the post. Friction-rollers may be placed above the arm 4 and below the arm 3, if desired.

On the outer end of the shaft of the pinion 7 is a sprocket-wheel 10, from which a sprocket-chain 11 extends to a sprocket-wheel 12, having its shaft-bearings in the upper portion of the post 1 or in a cross-head 13 on the post. To the shaft of the sprocket-wheel 12 is attached a grooved pulley 14, upon which is wound by two or three turns a chain, cord, or the like 15. This chain, cord, or the like has one end attached to the pulley 14, and to the other end is attached a counterbalance, here shown in the form of a weight 16. This counterbalance is designed to rotate the pinion 7 as the track or tracks become expanded by heat, so as to take up the slack, and obviously as the arms 3 and 4 are mounted one above and the other below the pinion they will both be moved outward by the downward movement of the weight. As the track or tracks contract by changes in the temperature such contraction will cause the

arms to be moved inward, which will impart movement to the pinion 7, and consequently draw the weight or counterbalance 16 upward. The arms 3 and 4 have upwardly-extended portions 17, arranged to slide on bars 18, and pivoted to the arms are levers 18^a, provided with teeth and adjustable weights. The teeth are designed to engage with stops 18^b when weight is brought upon the track to prevent the arms from moving too far outward, and supporting-cables 19 pass through the inner ends of the levers.

Secured to the intermediate posts 2 are cross-ties 20, having clips at their outer ends to receive the rails 5. These cross-ties are further supported by means of hangers 21, extended downward from the cross-head 22 on the top of the post 2, and also on each post 2, above the cross-tie, is a cross-bar 23, having perforations in its ends, through which the cables 19 pass.

It will be noted in Fig. 2 that the tracks 5 converge toward the intermediate posts 2 and that between the posts 2 the tracks are nearly parallel. Opposite tracks are connected between the posts 2 by means of cross-ties 24, which have clips at their ends, secured to the clips first described, with which the tracks 5 are engaged. Between the posts 1 and 2 automatically-adjustable cross-ties are connected to the tracks, and, as here shown, (see Figs. 7 and 8,) each cross-tie consists of telescopic sections 25 26. It may be here observed that the regulating or bracing of the track will take place mainly between posts 1 and 2. Therefore these self-adjusting cross-ties are employed. As the tracks expand and the arms 3 and 4 are forced outward to take up the slack the parts 25 and 26 of the cross-ties will be drawn slightly apart, and upon a contraction of the tracks it is obvious that the said sections will move together. It is to be understood, however, that I do not limit my invention to the construction of adjustable tie as shown as Fig. 7, and, further, while I have shown two ties between the posts 1 and 2 and two ties between the posts 2, it is obvious that a greater or less number may be employed, depending, of course, upon the distance apart the posts are placed.

While any suitable motive agent may be employed for propelling the cars along the tracks, I have here shown trolley-wires 27 (see Figs. 19 and 20) as supported by the cross-heads of the several posts or hangers and from which an electric current may be carried to the motor of a car in the usual manner, the return being either through the track or through a return-wire.

In rounding curves it may be necessary at certain intervals to force both tracks in one direction. For this purpose I may employ the construction shown in Figs. 9 and 10, in which a cross-head 28 is supported on two uprights or posts 29, and attached to the cross-head or suspended therefrom is a track 30, on which a frame is mounted to move. This frame comprises uprights 31, having grooved rollers 33 at the upper end which engage on the track 30, and at the lower ends of the uprights 31 a cross-tie 32 is attached and to the ends of which the rails 5 are secured. Pivoted on the journals of the rollers 33 on the uprights are levers 34, and the inner ends of these levers overlap and they are engaged by a weight 35. The levers at the outer sides of their pivoted points are provided with holes, through which the cables 19 pass. From the frame a chain or the like 36 extends to a connection with a drum 37, on the shaft of which is a pulley 38, to which one end of a cord or the like 39 is attached, and the free end of this cord is attached to a counterbalance or weight 40. Attached to the cross-head 28 is a rack 41, designed at certain times to be engaged by the upper portion of the strap which suspends the weight 35. In this construction when the rails 5 expand the weight 40 descends, winding the rope 36 on the drum 37, and hence draws the carriage or frame and the tracks 5 toward the side upon which the weight 40 is placed. Upon a contraction of the rails a reverse movement will take place. The weights 35 should be adjusted to slightly overbalance the weight or pressure exerted by the tracks on the cables 19, so that a car either on one track or a car on each track may raise the weight 35 and cause the upper portion of the strap suspending the weight 35 to engage with the rack 41, which will prevent the lateral movements of the track while the car or cars are passing this portion. The weight of the car or cars will cause a downward strain on the cables 19, because said cables, as plainly indicated in Fig. 7, pass underneath or through eyes 42 on the cross-ties between the posts 1 and 2 and also through eyes 43 on the cross-ties between the posts 2. The weight 35 may be adjusted so that it will be raised only when two cars are passing each other, and the weight 40 will in that case need to be heavy enough to resist any tendency of a single car or train on one track to draw it up, and thus diminish the tension.

The parts above described refer particularly to a double-track system; but there is no substantial difference between the appliance of parts of a double and single track railway. In the single-track system the spans between supports or posts are run in a slightly zigzag course, making a deflection of from three to five feet in a one-hundred-foot span, as indicated in Fig. 12. With this given deflection a further deflection or slack may be taken up by the mechanism which I will now describe. It may be stated here, however, that the spans in the single-track system may be much longer than in the double-track system. In fact, in practice the supporting-posts 44 may be placed about two hundred feet apart.

On each post 44 is a mechanism for either pulling the track 5 toward the post or push-

ing the track from the post, depending upon which side of a roller or pulley the counterbalance-weight is placed. This mechanism consists of an arm 45, having teeth on its lower side engaging with a pinion 46, supported on the post 44, and bearing upon the upper edge of this arm 45 is a roller 47. (See Figs. 15 and 16.)

On the shaft of the pinion 46 is a spirally-grooved pulley 48, from which a cord, chain, or the like 49 extends over a pulley 50, mounted on the cross-head 51 on the post 44, and to the free end of this cord, chain, or the like 49 is attached a counterbalance or weight 52. By making the pulley 48 cone-shaped, with a spiral groove, as shown, the effective force of the weight 52 in moving downward is gradually increased because of the rope 49 moving gradually from a smaller to a larger diameter on the pulley 48. The arm 45 has a downward extension 53, to which the rail 5 is secured in the manner before described, and an upwardly-extended portion 54 of this arm engages over and is adapted to slide upon a track 55, supported on the cross-head 51.

Pivoted to the upper portion of the upward extension 54 is a lever 56, having a rack 57 on its upper side adapted to be engaged, when an excessive weight is brought to bear upon the track 5, with a tooth 58, arranged at the end of the track 55. The operation of this lever 56 may be governed by a weight 59, adjustably mounted on the lever, or by a spring. The supporting-cable 19 extends through an opening in this lever 56 rearward of its pivotal point. The object of this lever 56 is to prevent any lateral movement of the arm 45 when the load is on the adjacent spans, as the load otherwise might cause the weight 52 to rise, and thus allow the track to sag. I propose to make the weight 52 just heavy enough to give the track and suspending-cable a proper tension for the load of cars, and then as the car runs onto a span its weight will first be felt by the cable 19, which will raise the lever 56, the rack of which will engage with the tooth 58, and thus prevent further movement of the arm 45 while the track is loaded. The weight 59 is adjusted on the lever 56 to slightly overbalance the weight of the track and suspending-cable, and hence when there is no load on the track the weight 59 holds the rack 57 out of engagement with the tooth 58, so that there will be no interference with the apparatus for automatically adjusting the tension at times when no load is on the track between supports.

Arranged between the posts 44 are swinging supporting devices for the track 5. This rocking or swinging supporting device is clearly shown in Fig. 17, (see also Figs. 13 and 14,) in which a hanger 60 is mounted to swing on a post 61, and to the lower end of this hanger 60 is pivotally connected a supporting-bar 62, which is designed to move freely under a support or between pins 63 on the post 61, and the inner end of this bar 62 supports the track 5. The swinging support will allow the track to pull a little away from the post, so that the track may be kept straight or nearly level.

Arranged about midway between the supporting devices comprising the post 61 and the post 44 laterally-extended arms 64 are attached to the track 5, and the opposite ends of these arms are connected to a rod or beam 65, which has an anchor cord or chain 66 extended from it to the ground or other fixture. The suspending-cable 19 is in connection with these arms 64, as plainly indicated in Fig. 13. One of these anchoring devices is designed to be used between every two posts, although they may be dispensed with by extending a cable 67 directly from post to post instead of connecting it to the arm 64 in the manner as here shown. This auxiliary supporting-cable 67 extends through the bars 62 and also through the lower portions of the arms 45, and between the anchors and the post this cable 67 extends through arms 68, which are attached to the track 5 and are supported from the cable 19 by suitable hangers, the hangers connecting with the arms 68 near their connection with the track.

Fig. 18 shows a modified form of supporting device that may be used in place of that shown in Fig. 15. It has a rocking beam 69, pivoted to a post 70, and attached to this rocking beam 69 is an arm 71, upon the inner end of which the track 5 is mounted, and to this end the said arm 71 is supported by a hanger 72, extended downward from the cross-head 73. When this device is used, the cable 19 may be passed through an opening in the upper end of the projection or finger 74 upon the arm 71, while the cable 67 will pass through an opening in the arm. In this instance the counterbalance or weight 75 has its rope or chain 76 extended over a pulley 77 on the upper end of the beam 69 and thence over a pulley 78 on the cross-head 73, thence around a pulley 79 on the shaft of the pulley 77, and the end of the rope or chain is then fastened to the cross-head 73, as indicated in Fig. 18. This weight 75, it is to be understood, will serve to regulate the tension of the track and cable in the same manner as before described. If desired, the post 70 may be braced by another post 80, connected to the cross-head 73 and extended into the ground at the opposite side of the track, and the post 61 may be similarly braced by means of another post 81.

In Figs. 19 and 20 I have shown posts 81^a, which may be alternated with the posts 44 for the sake of economy and for the better bracing of the track lengthwise. On one of the posts 81^a are arms 82 for supporting the track, and from these arms rods 83 extend to arms 84 on the post, and from which braces 85 extend.

In Fig. 21 I show a support that may be used intermediate of the posts 2 either on

curves or straight lines. In this device the hanger-frame 86 will be rigid with relation to the cap-piece of the post when used in straight stretches, but will be arranged to slide when in curved sections.

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

1. A suspended railway-rail, cables for suspending the rails, and means for directing the rail laterally when expanding or contracting, substantially as specified.

2. A suspended railway-rail, a cable supporting the rail and a counterbalance governing lateral movements of the rail due to expansion and contraction, substantially as specified.

3. A suspended railway-rail, suspending-cables for sustaining the rail, supporting devices for supporting the rail and cable, and a counterbalance for moving the said supporting devices in one direction upon the expansion of the rail, the said supporting devices being moved in the opposite direction by the contraction of the rail, substantially as specified.

4. In a suspended railway, a suspended track, supporting-posts, track-supporting arms movable transversely of the posts, and weight-operated mechanism for moving the arms in one direction, substantially as specified.

5. In a suspended-railway system, a suspended track, supporting-posts, arms movable transversely of the posts and with which the track is connected, a suspending-cable having connection with said arms and also having connection with parts extended from the track between the supporting-posts, and weight-actuated mechanism for moving said arms in one direction upon an expansion of the track, substantially as specified.

6. In a suspended railway, a suspended track, supporting-posts, arms movable transversely of said posts and to which the track is connected, pinions on the posts for engaging racks on the arms, and weights for actuating the pinions for moving the arms in one direction, substantially as specified.

7. In an elevated railway, supporting-posts, track-supporting arms movable transversely of the posts, pinions mounted on the posts and engaging with racks on the arms, hangers connecting the outer portions of the arms with cross-heads on the posts, and weights for operating the pinions to move the arms in one direction, substantially as specified.

8. In an elevated railway, a series of supporting-posts, arms movable transversely on said posts, the said arms having racks, pinions on the posts with which the racks engage, sprocket-wheels on the shafts of the pinions, counterbalance-weights, pulleys with which said weights have flexible connection, sprocket-wheels on the shafts of said pulleys, sprocket-chains connecting said sprocket-wheels with the first-named sprocket-wheels, and a track supported by the arms, substantially as specified.

9. In an elevated railway, a support for the track and adapted to be arranged at a curve of said track, the said support comprising a post or posts, a track supported by said post or posts, a frame movable on said track and supporting the railway-track, a weight for moving said frame in one direction, and a stopping device to stop the movement of said frame when a car is moving along the track adjacent to the frame, substantially as specified.

10. In an elevated railway, supporting-posts, arms movable transversely of said posts, a track attached to said arms, intermediate supporting-posts, cross-ties on said intermediate posts with which the track connects, and a supporting-cable for the track, substantially as specified.

11. In an elevated railway, supporting-posts, arms on said supporting-posts and movable in opposite directions, means for causing outward movements of said arms, tracks supported by the arms, intermediate supporting-posts, cross-ties on said intermediate posts and connecting opposite tracks, and cross-ties connecting the opposite tracks between the intermediate supporting-posts, substantially as specified.

12. In an elevated railway, main supporting-posts, oppositely-movable arms on each of said posts, means for causing outward movement of said arms, tracks supported by the arms, intermediate supporting-posts, cross-ties connected to said intermediate posts and connecting the opposite tracks, and automatically-adjustable cross-ties connecting the opposite tracks between the main supporting-posts and the intermediate supporting-posts, substantially as specified.

13. A supporting device for an elevated railway, comprising a supporting-post, a track-supporting arm movable transversely of the post, and a weight for moving said arm in one direction, substantially as specified.

14. In an elevated railway, a supporting-post, an arm movable horizontally on the post, a weight for moving said arm in one direction, a track supported by said arm, a lever pivoted to an upward projection of said arm, a rack on said lever, a tooth on the supporting-post or on the cross-head thereof for engaging said rack, a weight adjustable on the lever, and a cable having connection with said lever and also with the track, substantially as specified.

15. In an elevated railway, main supports, arms on said main supports and extended in opposite directions, tracks supported on said arms, a counterbalance for moving the arms in one direction, intermediate supporting-posts, cross-ties on said intermediate posts and connected with the opposite tracks, the said tracks being convergent from the main supporting-posts to the intermediate posts,

and adjustable cross-ties connecting the opposite tracks between the main posts and the intermediate posts, substantially as specified.

16. In an elevated railway, main supporting-posts, horizontally-movable arms supported by said posts, a track supported on said arms, anchoring-arms having connection with the track, cables connecting the arms of the posts with the anchoring-arms, and an anchoring-cable extended from the anchoring-arms to the ground or the like, substantially as specified.

JOHN WISDOM GONCE.

Witnesses:
J. L. GONCE,
C. W. TAYLOR.