May 24, 1932. P. GALKO 1,860,241

ELEVATED ELECTRIC RAILWAY

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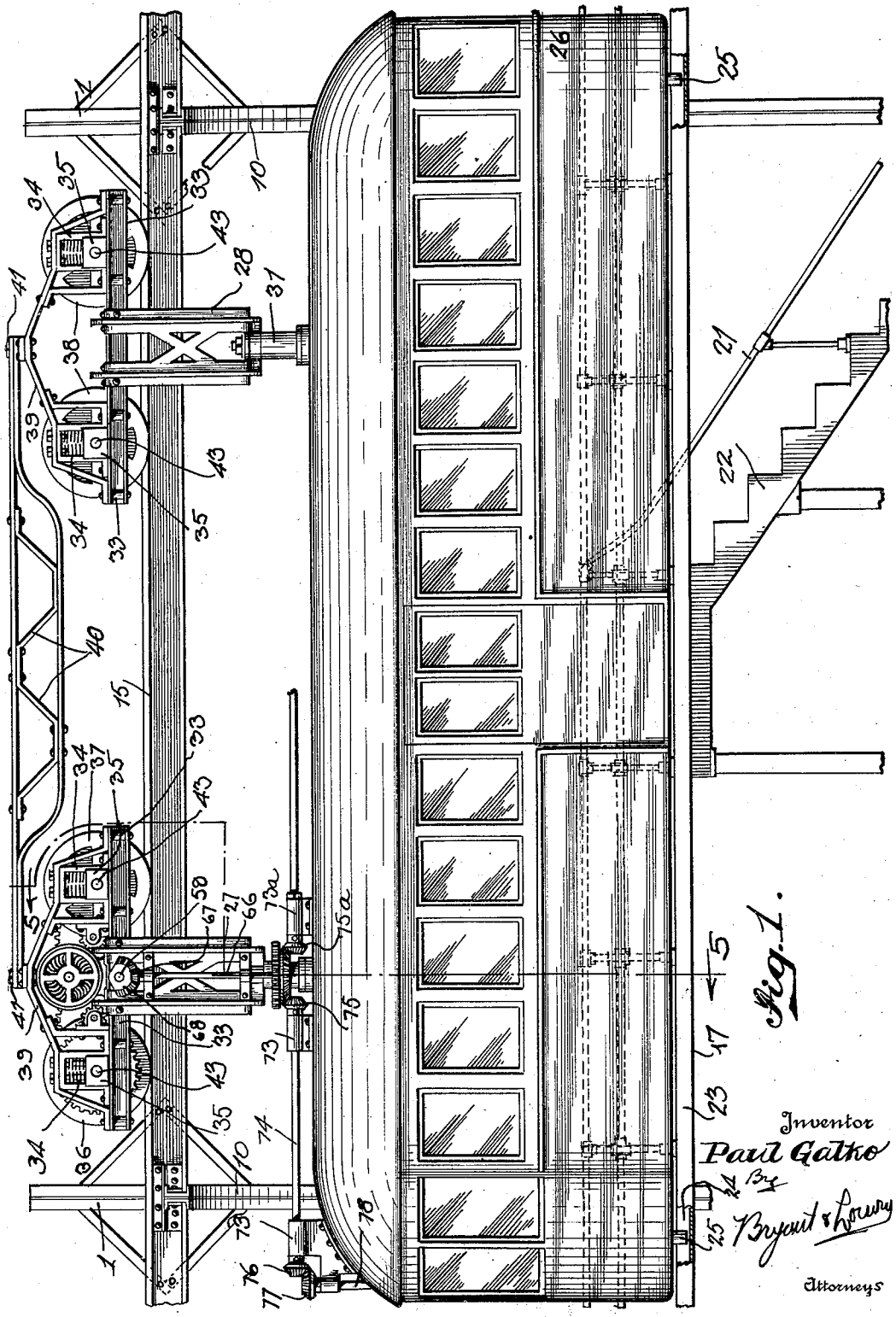


Fig. 1.

Inventor
Paul Galko
By
Bryant & Lowry
Attorneys

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ELEVATED ELECTRIC RAILWAY

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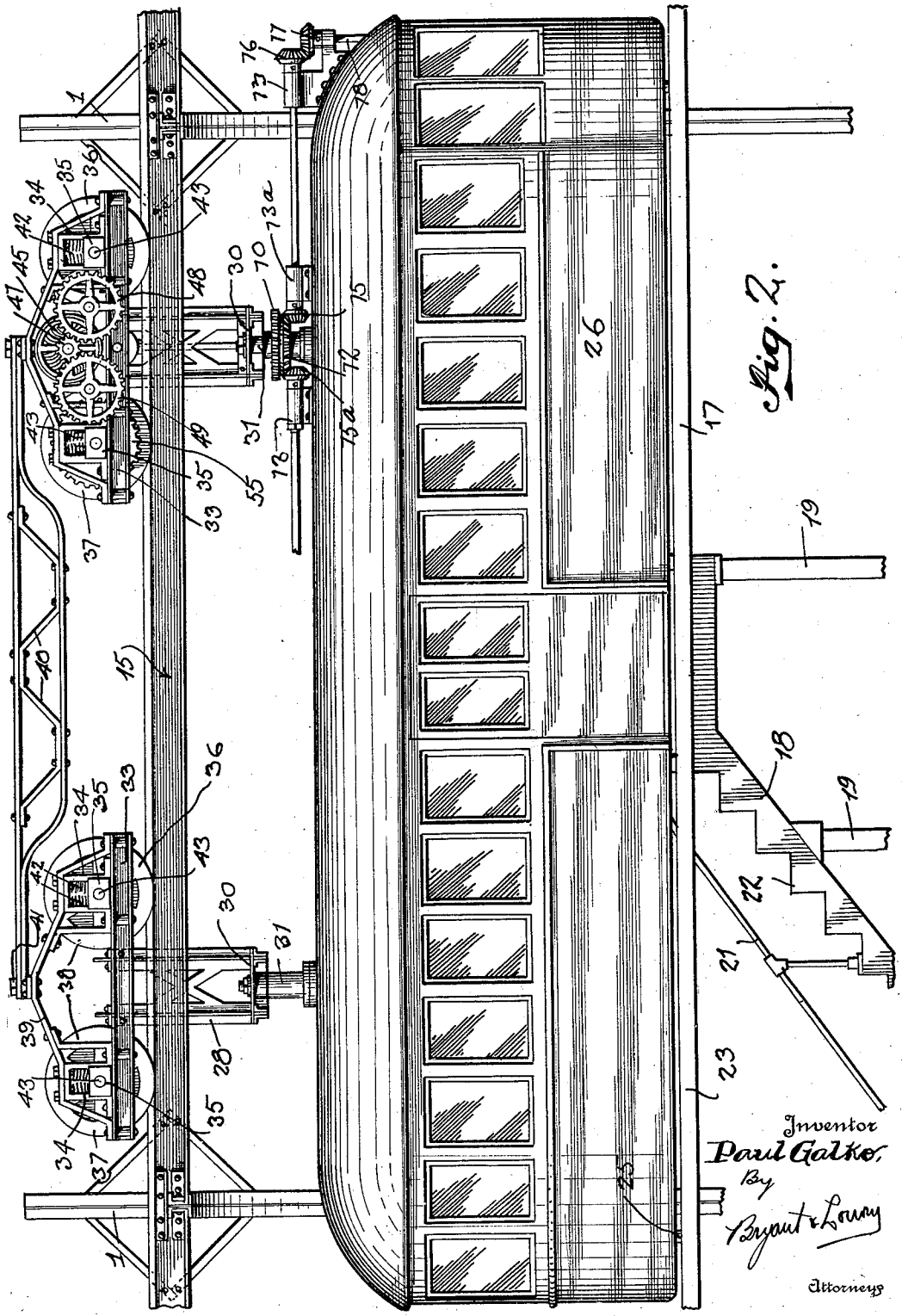


Fig. 2.

Inventor
Paul Galko,
By
Bryant & Lowry
Attorneys

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ELEVATED ELECTRIC RAILWAY

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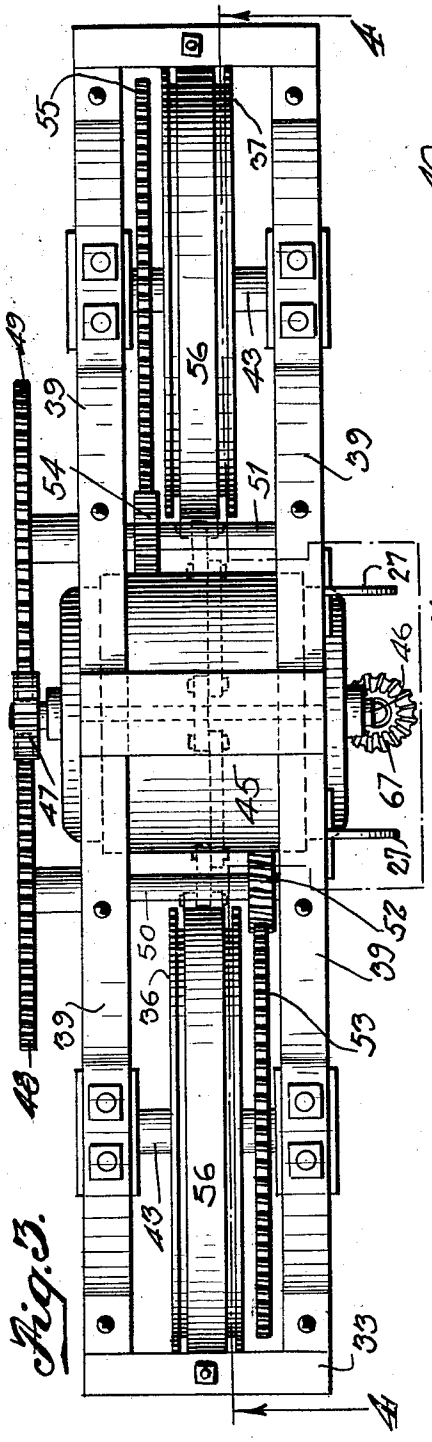


Fig. 3.

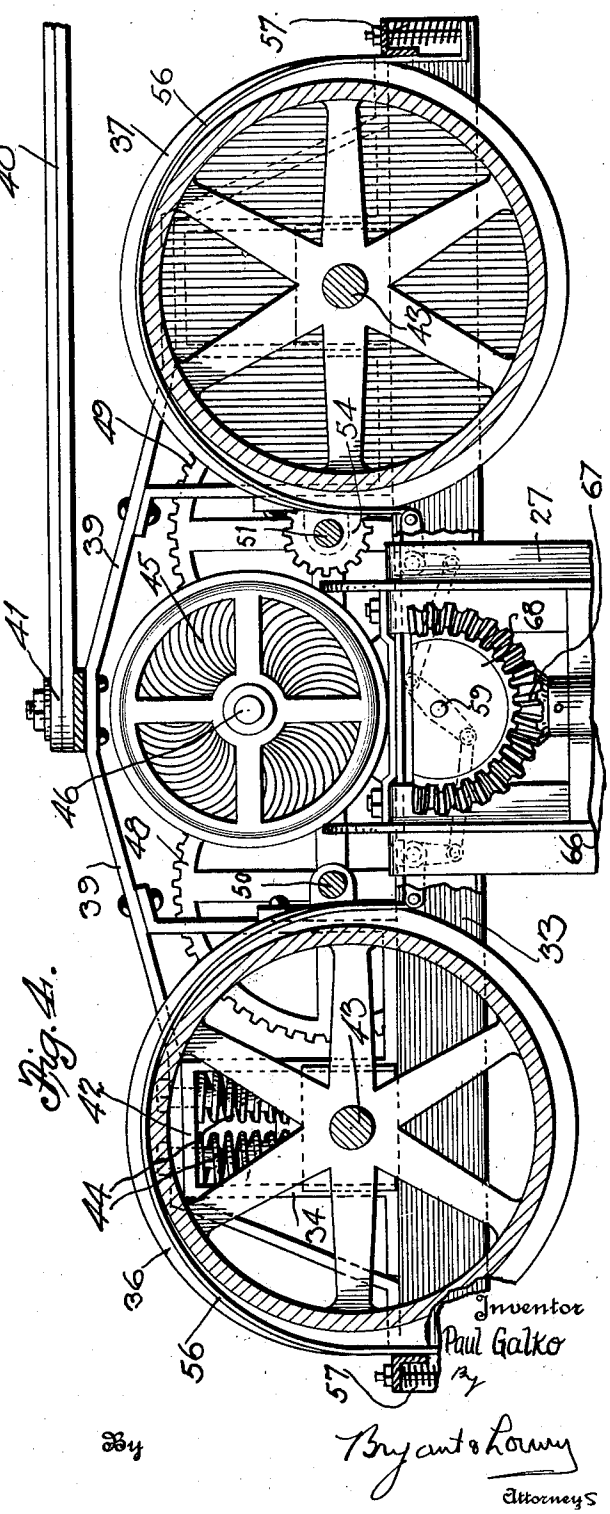


Fig. 4.

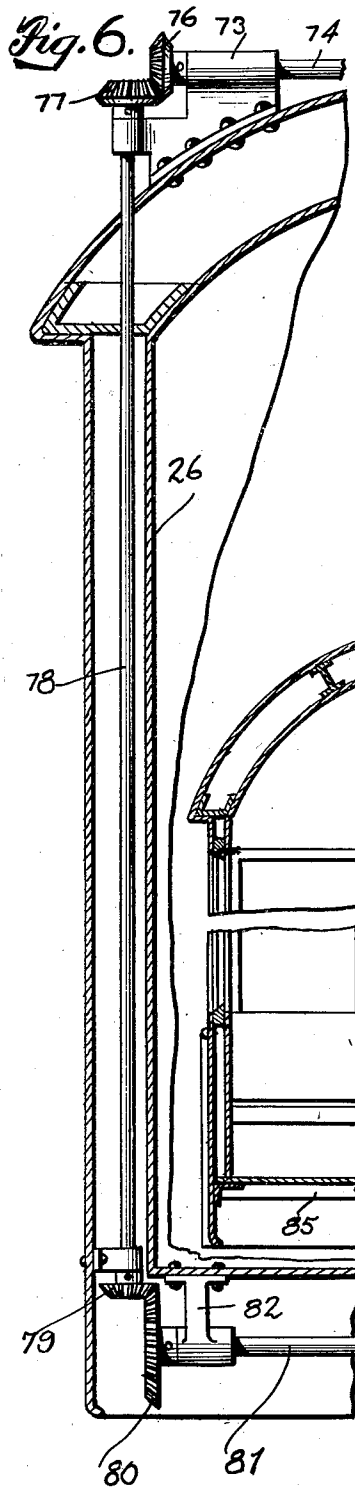
Inventor
Paul Galko
By
Bryant & Lowry
Attorneys

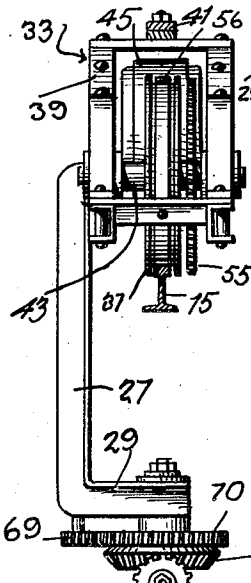
May 24, 1932. P. GALKO 1,860,241

ELEVATED ELECTRIC RAILWAY

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Fig. 6.





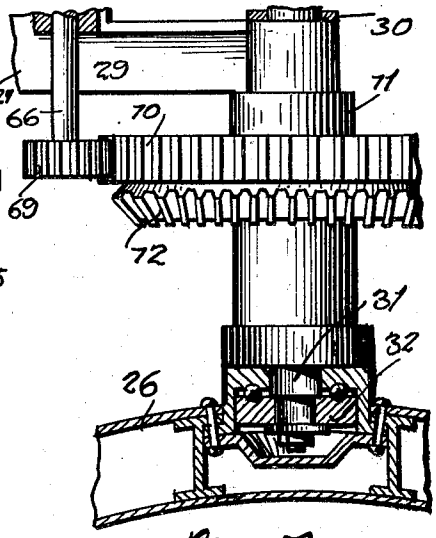


Fig. 7

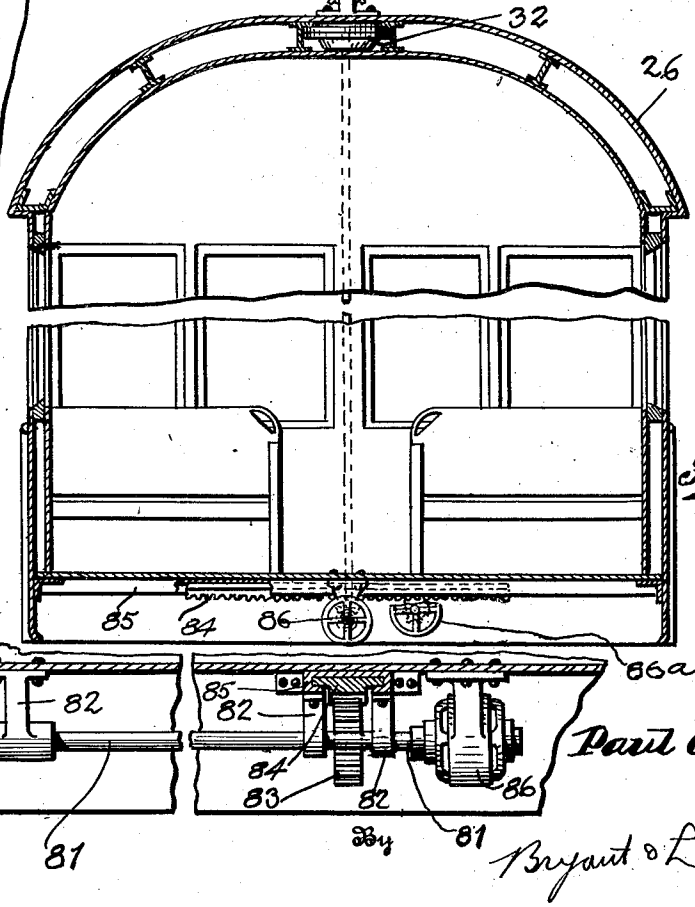


Fig. 5.

Inventor
Paul Galko.

By Bryant & Lowry
Attorneys

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ELEVATED ELECTRIC RAILWAY

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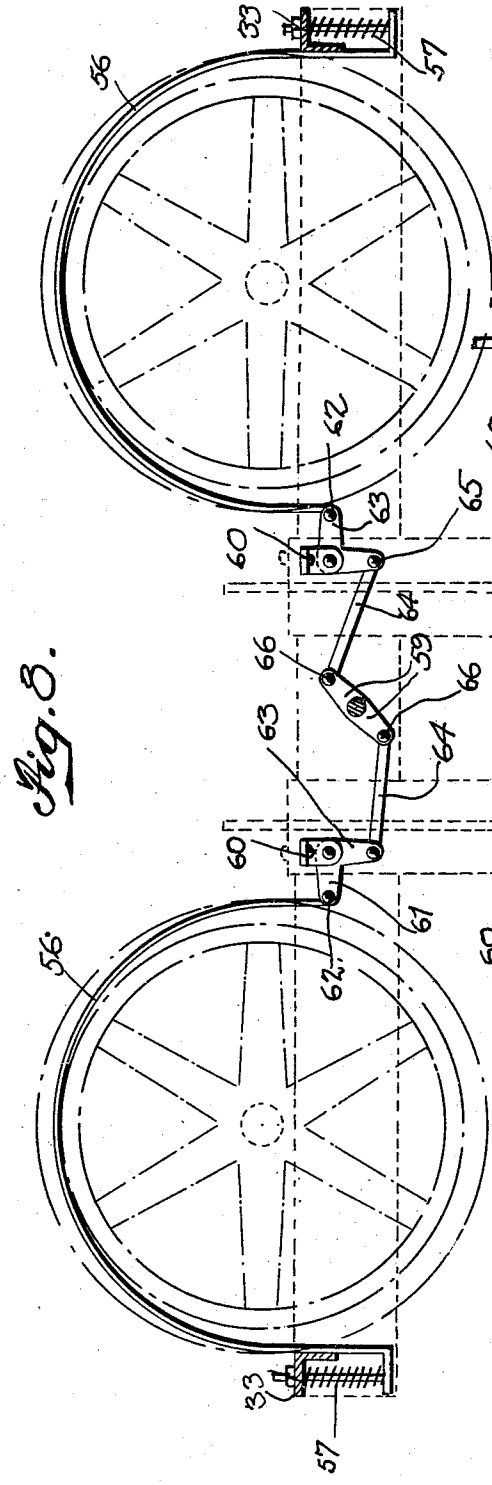


Fig. 8.

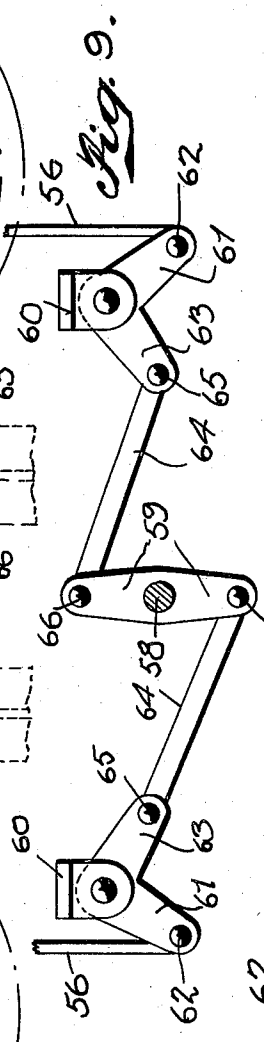


Fig. 9.

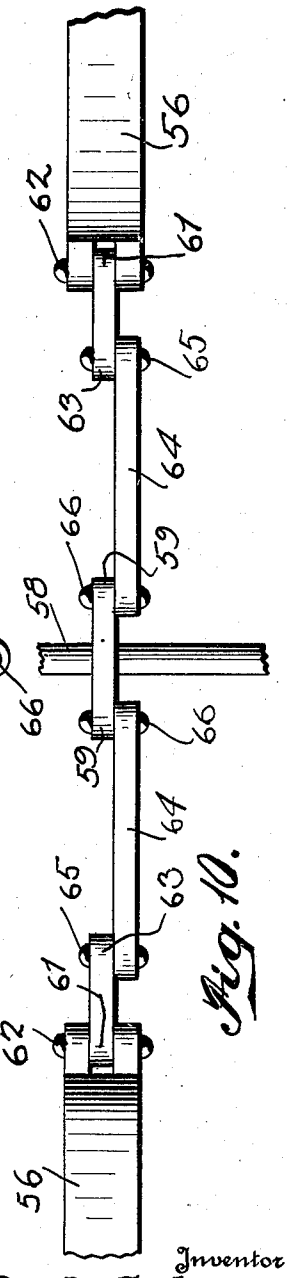


Fig. 10.

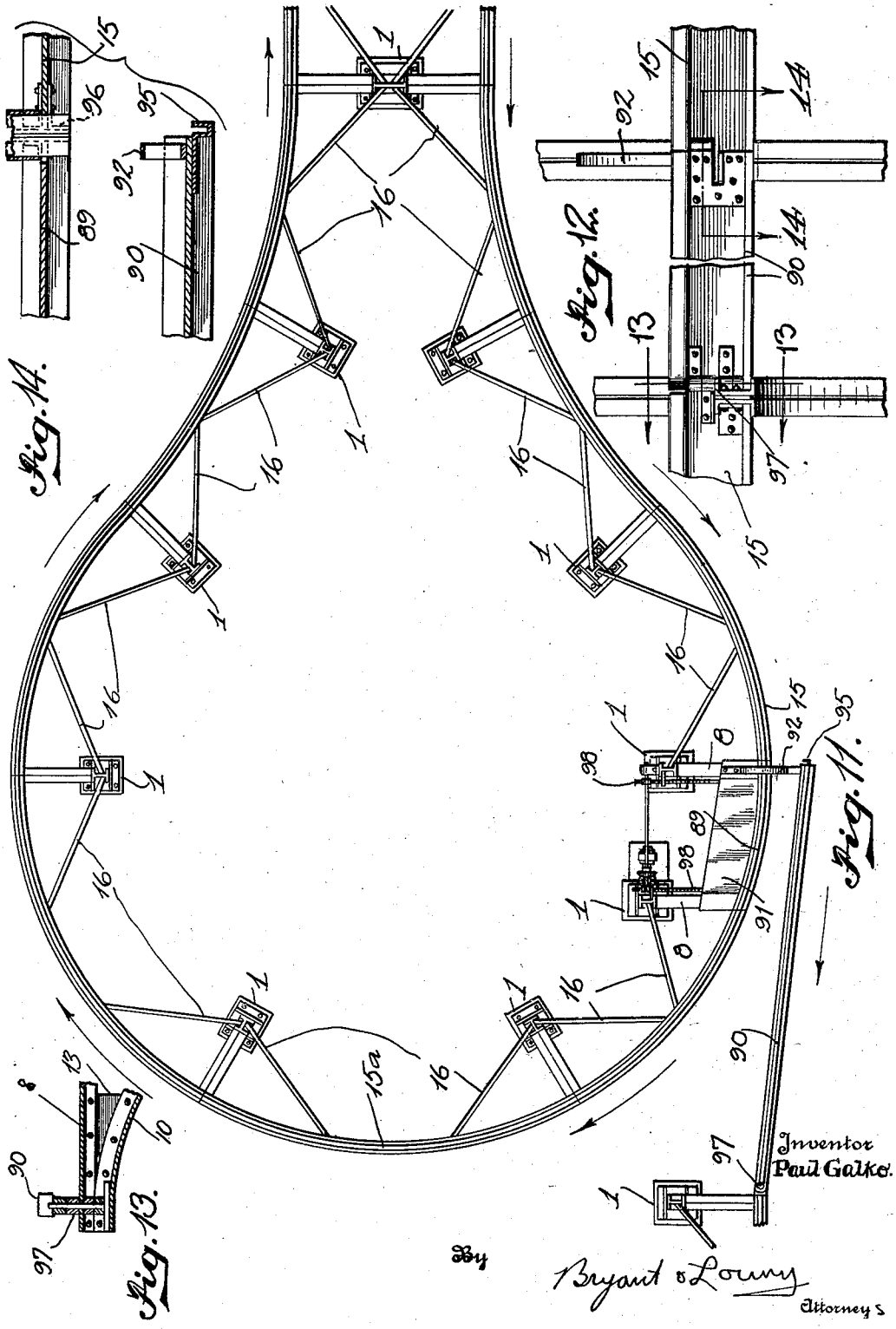
Inventor
Paul Galko.

By Bryant & Lowry
Attorneys

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ELEVATED ELECTRIC RAILWAY

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Fig. 15.

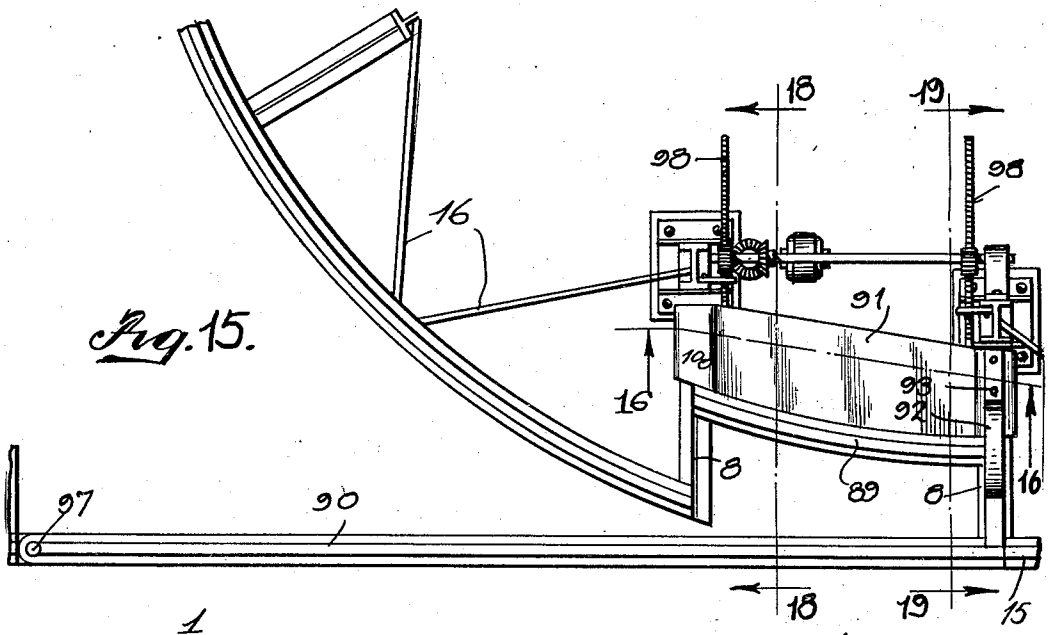


Fig. 16.

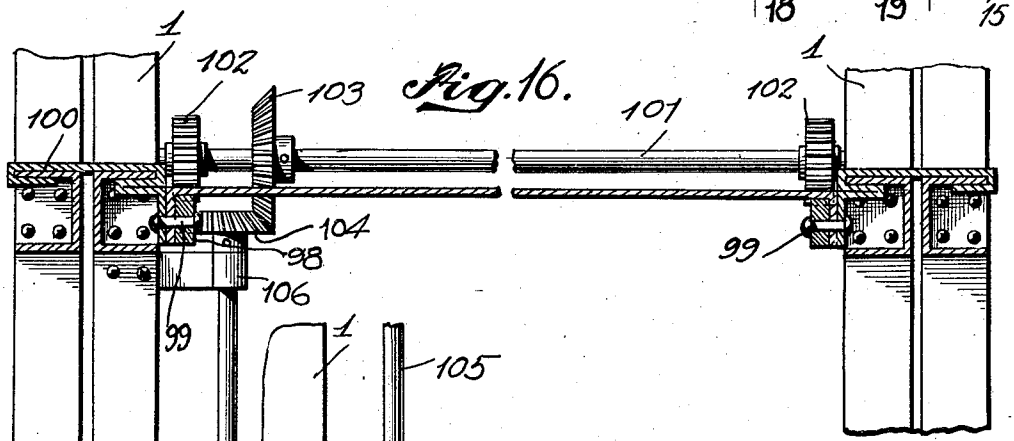
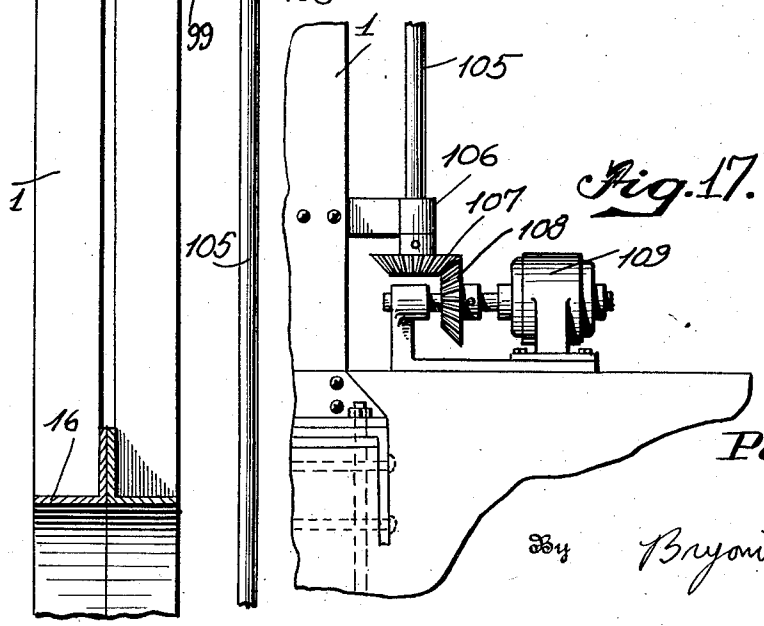


Fig. 17.



Inventor
Paul Galko.

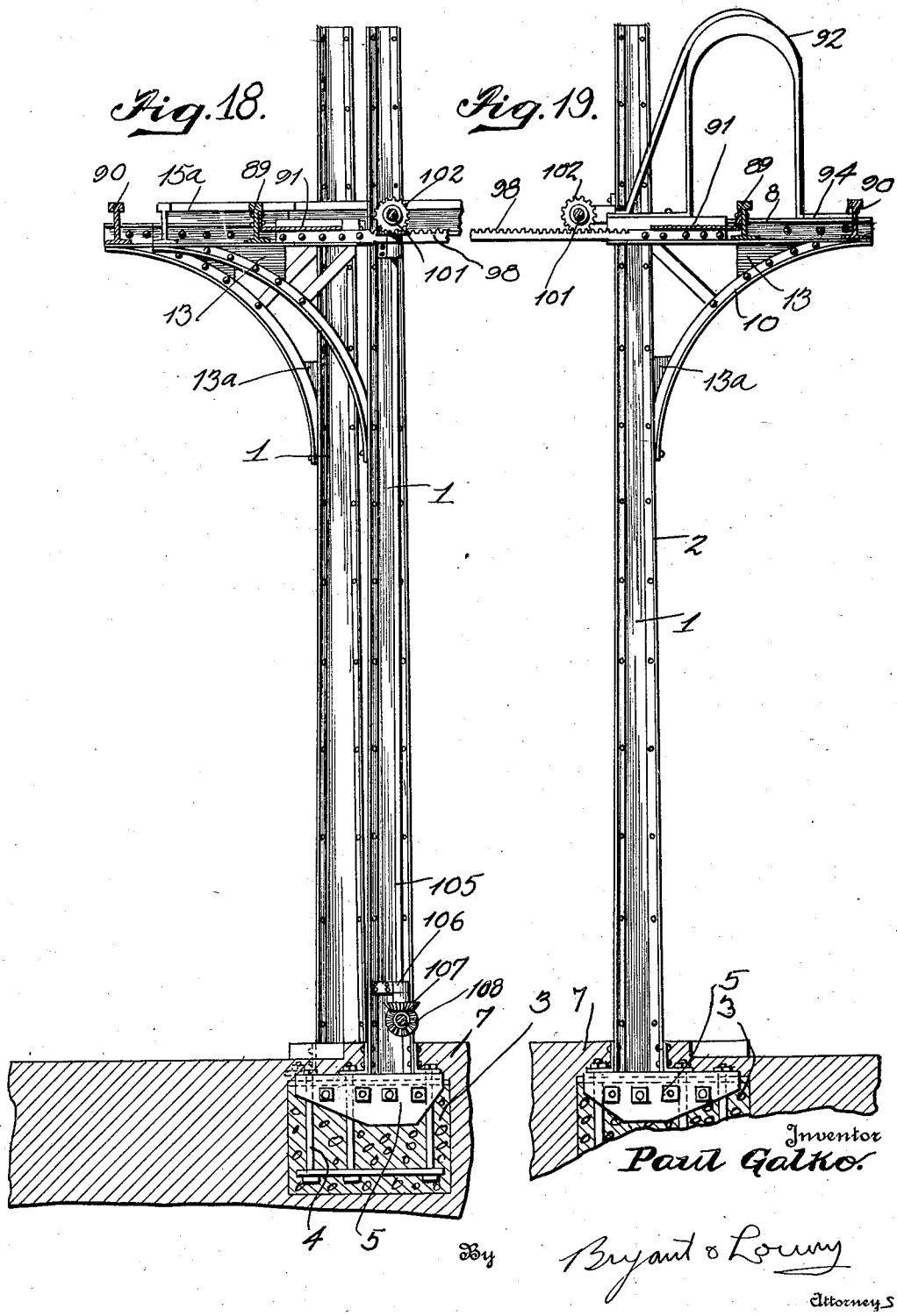
By Bryant & Lowry

Attorneys

May 24, 1932. P. GALKO 1,860,241

ELEVATED ELECTRIC RAILWAY

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Inventor
Paul Galko.

By Bryant & Lowry

Attorneys

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ELEVATED ELECTRIC RAILWAY

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Fig. 20.

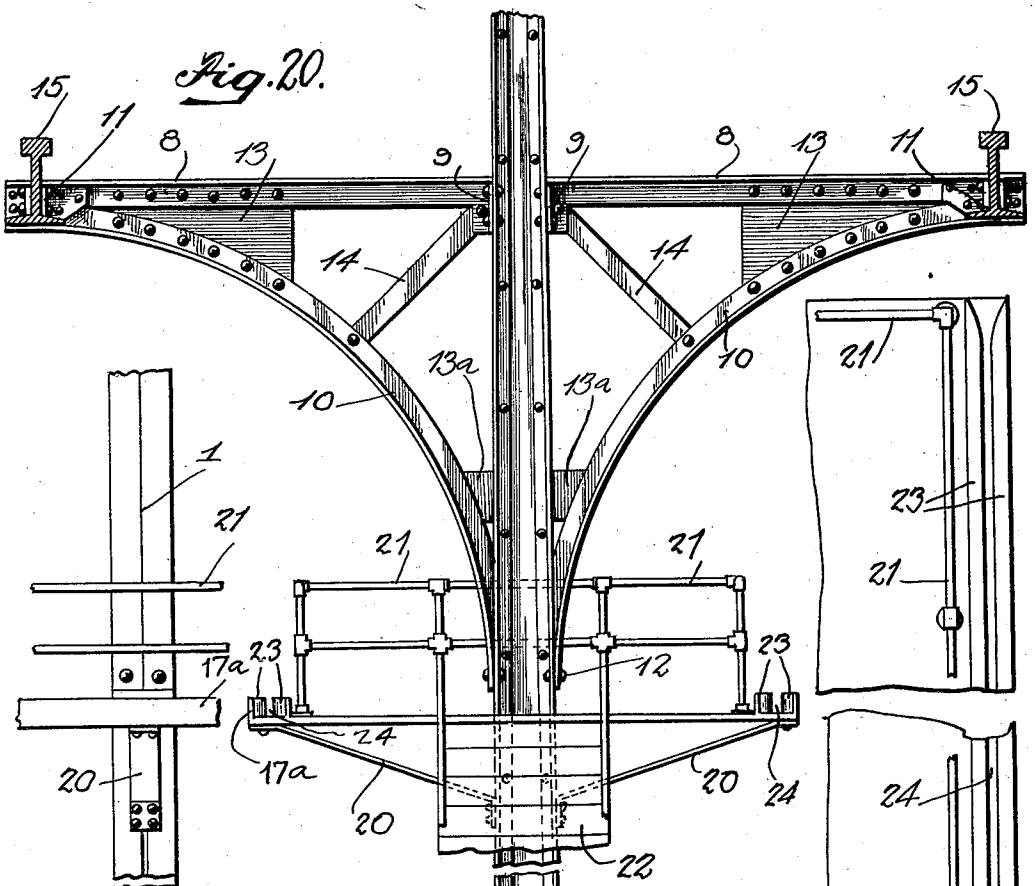


Fig. 22.

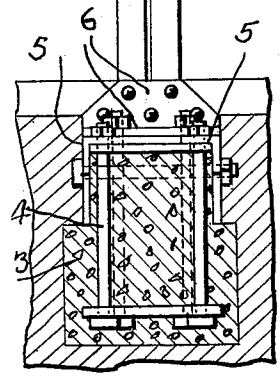
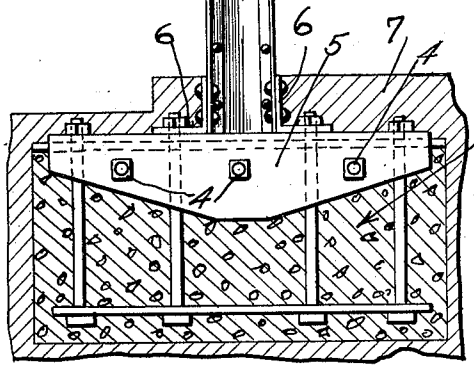


Fig. 21.



Inventor
Paul Galko
By
Bryant & Lowry
Attorneys

Patented May 24, 1932 1,860,241

UNITED STATES PATENT OFFICE

PAUL GALKO, OF DETROIT, MICHIGAN

ELEVATED ELECTRIC RAILWAY

Application filed September 19, 1929. Serial No. 393,744.

This invention relates to certain new and useful improvements in elevated electric railways.

One of the objects of the invention is to provide an elevated electric railway wherein a car is suspended by hangers from a monorail so that the street or pavement may be free of the usual surface track structure to present an undisturbed road bed.

Another object of the invention is to provide an elevated electric railway wherein a pair of hangers for the car carry rollers mounted upon a monorail, one of the hangers being equipped with an electric motor energized through the provision of electrical devices associated with the monorail that is electrically charged, the invention further embodying the idea of equipping the car with batteries or a source of electrical energy that may be communicated to the motor on the hanger, the motor having gear connections with two traction wheels by which the hanger is suspended for positively propelling the car.

Another object of the invention is to provide an electric railway of the type set forth wherein the traction wheels of the hanger are equipped with brake mechanism that is motor operated from a point within the car for arresting movement of the car.

A still further object of the invention is to provide an elevated electric railway wherein the posts for supporting the elevated monorail may be located at the edge of a sidewalk adjacent the pavement or street so that the pavement or street will be free of the usual surface tracks, it being a further object to provide center poles or posts between the sidewalk having cross-heads for the support of a monorail on each side, whereby the elevated cars travel centrally of the street between the sidewalks.

A still further object of the invention is to provide an elevated electric railway of the monorail type wherein the single rail is equipped with switch mechanism for changing the direction of travel of a car.

The invention relating to an electric elevated railway, it is to be understood that at one or more points in the rail system, such as at terminals, the elevated monorail is to be inclined downwardly so that a car suspended on the rail may be disposed adjacent the ground line to permit access thereto for cleaning, washing and repair work.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings:—

Figure 1 is a fragmentary side elevational view of the elevated electric railway showing a car suspended by hangers on a monorail, one of the hangers being equipped with an electric motor to effect propulsion of the car and further illustrating an elevated landing platform;

Figure 2 is a fragmentary side elevational view taken from the opposite side as shown in Figure 1 and illustrating the gear drive between the motor on one of the hangers and the supporting wheels;

Figure 3 is a top plan view of the hanger equipped with the operating motor;

Figure 4 is a vertical longitudinal sectional view taken on line 4—4 of Figure 3 showing the brake bands for the traction wheels;

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 1, showing the motor operating mechanism for applying the brake bands to the traction wheels;

Figure 6 is an enlarged fragmentary detail sectional view showing a part of the brake operating mechanism;

Figure 7 is a detail sectional view showing a part of the hanger and car suspended thereby;

Figure 8 is a side elevational view of the brake bands and operating levers therefor with a portion of the hanger truck illustrated in dotted lines, the brake band and operating levers being in their releasing positions;

Figure 9 is a side elevational view of the brake bands and operating levers in brake applying position;

Figure 10 is a top plan view of the brake band;

Figure 11 is a top plan view of a portion of the elevated track structure showing a loop terminal and a track switch;

Figure 12 is a fragmentary side elevational view of a part of the track structure;

Figure 13 is a detail sectional view taken on line 13—13 of Figure 12;

Figure 14 shows parts in section that are taken on line 14—14 of Figure 12;

Figure 15 is an enlarged fragmentary plan view of a part of the track structure showing the switching mechanism of the mono-rail;

Figure 16 is an enlarged sectional view, partly broken away and taken on line 16—16 of Figure 15;

Figure 17 is a fragmentary side elevational view illustrating the motor and driving mechanism for shifting the track switch, being a continuation of the lower end of Figure 16;

Figure 18 is a vertical cross-sectional view taken on line 18—18 of Figure 15;

Figure 19 is a vertical cross-sectional view taken on line 19—19 of Figure 15;

Figure 20 is a fragmentary elevational view of a supporting pole or post for mono-rails, the post having a T-head for supporting a mono-rail at each side thereof and showing a double landing platform.

Figure 21 is a fragmentary top plan view of the landing platform; and

Figure 22 is a fragmentary edge elevational view of the supporting pole or post.

The elevated track structure and associated appurtenances embodies poles or posts having single side arm extensions for the support of mono-rails located on sidewalks adjacent the street or pavement so that the street may be clear of all posts and track structures, or the posts may be placed centrally of the street or pavement with cross arms at the upper end for the support of mono-rails thereon. The posts may be of any preferred construction, such as channel, angle or tubular iron, the posts being preferably formed of a bar 1 as shown in Figures 18 to 22 having angle irons 2 secured to the edges thereof as reinforcements. The lower end of the post 1 is set into a concrete block 3 and anchored thereto by tie rods 4 and interfitting metal plates 5 that are attached to the ends of the post by angle members 6, the concrete block 3 being imbedded in the ground 7 as clearly shown in Figures 20 and 22. Where the posts are mounted at the sides of the pavement, a single arm projects horizontally from the upper end thereof for supporting mono-rails at their outer ends while double arms project from opposite sides of the upper ends of the posts when the latter are disposed centrally of the pavement. Each horizontal arm 8 is of angle iron construction and is riveted or otherwise secured as at 9 at its inner end to the post 1 while a curved angle iron brace 10 is engaged with the outer end of the arm 8 as at 11, while its inner lower end is secured as at 12 to the post 1. Plate braces 13 extend between the outer ends of the arms 8 and curved braces 10 while brace rods 14 extend between the curved braces 10 and the inner ends of the arms 8, brace blocks 13*a* being positioned between the braces 10 and posts 1. A rail 15 is supported at the outer ends of the arms 8 forming the elevated track structure and is suitably anchored in position with the ball or tread disposed above the arms. The arms and rails are further braced by the struts 16 extending between the posts 1 adjacent their upper ends and the rails 15 at points spaced from the arms 8 as shown in Figure 11.

As shown in Figures 1 and 2, a single loading platform 17 is supported on the posts 1 disposed at the sides of the pavement and adjacent to a stairway 18 mounted upon ground supports 19 to permit ascent and descent of passengers from the loading platform 17.

The loading platform 17*a* shown in Figure 20 is associated with a post having rail supporting arms at each side thereof, the platform 17*a* being supported on the post by angle braces 20 with a superposed guard rail 21 and a central stairway 22 extending from the platform 17*a* to the ground line. The platform is fragmentarily illustrated in plan view in Figure 21, each platform being provided adjacent its outer longitudinal edge with spaced guide ribs 23 providing an intermediate guide slot 24 to receive end lugs 25 depending from the car 26 as shown in Figure 1 to rigidly support the suspended car above the platform against tilting or swinging movement which would otherwise be occasioned by the unbalancing of the car during entrance and exit of passengers therefrom.

The car 26 and its hangers carried by trucks supported on the rail 15 is shown more clearly in Figures 1 to 7, a pair of U-shaped hangers 27 and 28 being provided for the suspension of a car, the lower angle end 29 of each hanger being provided with a cross bar 30 in which a post 31 is swiveled, the lower end of the post 31, as shown in Figure 7 having a swivel connection 32 with the top wall of the car 26. A truck 33 is carried by the upper angle end of each hanger 27 and 28 and is provided with spring enclosed guides 34 for bearing blocks 35 that support axles upon which wheels are mounted, the wheels 36 and 37 associated with the truck carried by the hanger 27 being motor driven while the wheels 38 carried by the truck 33 associated with the hanger 28 are idle, the wheels 36, 37 and 38 being grooved and riding upon the mono-rail 15. Brace bars 39 extend between the bearing guides on each

truck 33 and are anchored at their ends to the truck while a frame brace 40 extends between the brace bars 39 of the spaced trucks of a single car and is anchored at its ends thereto as at 41.

The spring mounting for the trucks 33 includes coil springs 42 set into the guides 34 above the axle blocks 35, the weight of the car 26 and truck structures being supported on the springs that rest at their lower ends upon the axle blocks 35, each block providing a bearing support for the wheel axle 43 upon which the track wheels are mounted. The frame brace 40 holds the wheel trucks in spaced relation to maintain constant vertical disposition of the hangers 27 and 28 to eliminate any binding action of the trucks 33 in riding over the mono-rail 15.

The wheels upon one truck frame 33 may be termed idle wheels as they freely roll over the mono-rail 15, while the wheels 36 and 37 upon the other truck frame 33 are positively driven and by frictional contact with the mono-rail 15 effect propulsion of the car 26. It is to be understood that it is in the realm of the present invention to positively drive the wheels on each truck frame, although a single driven truck, is herein shown and described. As shown in Figures 1 to 4, the traction wheel 36 is equipped with electric contact pressure 44 cooperating with the axle 43 of the wheel 36 for receiving electric energy from a source of supply that may be delivered through the rail 15 and by the provision of suitable electrical connection, such energy is transmitted to electric motor 45 for rotating the motor shaft 46. One end of the motor shaft 46 carries a pinion 47 that meshes with gears 48 and 49 fixed to shafts 50 and 51 journaled transversely of the truck frame 33. A pinion 52 carried by the shaft 50 meshes with the gear 53 fixed to the shaft 43 that carries the traction wheel 36 while a pinion 54 fixed to the shaft 51 meshes with the gear 55 fixed to the shaft 43 that carries the traction wheel 37, the two wheels 36 and 37 being positively driven to effect propulsion of the car 26.

Operation of the motor 45 is manually controlled from within the car 26 and as shown in Figures 4 and 8 to 10, includes a pair of brake bands or straps 56 overlying the traction wheels with their outer ends spring anchored as at 57 to the truck frame 33 while their inner ends are associated with lever and link devices operated by motor mechanism for moving the bands or straps 56 into binding engagement with the traction wheels 36 and 37. A shaft 58 is journaled transversely of the truck frame 33 beneath the motor 45 and has a cross arm 59 secured thereto and extending at opposite sides of said shaft. Bracket mountings 60 on the truck frame, each support a bell crank lever having one leg 61 attached as at 62 to the adjacent end of the brake band 56 while the other leg 63 of the bell crank lever has one end of the link 64 connected thereto as at 65, while the other end of said link is connected as at 66 to the adjacent end of the cross arm 59, duplicate parts being provided at each end of the cross arm 59 for association with the adjacent ends of the brake bands 56. The operating means for the cross shaft 58 includes a vertical shaft 66 journaled in the hanger 27 and having a bevel gear 67 fixed to its upper end that meshes with segment gear 68 fixed upon the end of the shaft 58, this construction being clearly shown in Figures 1 and 4. The lower end of the shaft 66 carries a pinion 69 meshing with a gear 70 fixed upon the sleeve 71 freely rotatable on the stub shaft 31 as shown in Figure 7, gear 70 being of the double type and having a lower integral bevel gear 72. As shown in Figure 1, a pair of bearings 73 on the top of the car 26 supports a horizontal shaft 74 having a bevel pinion 75 upon one end thereof that meshes with the bevel gear 72, the opposite end of the shaft 74 extending to the end of the car 26. The bracket bearing 73*a* supports a stub shaft carrying a bevel pinion 75*a* meshing with the opposite side of the bevel gear 72 to insure easy operation of the mechanism.

The forward end of the shaft 74 carries a bevel gear 76 meshing with the bevel gear 77 upon the upper end of the shaft 78 journaled at the forward end of the car as shown in Figure 6, the lower end of the shaft 78 carrying a bevel pinion 79 that meshes with the bevel gear 80 fixed to the shaft 81 journaled in brackets 82 depending from the bottom of the car 26. The shaft 81 extends transversely of the car 26 from the motor 86 and is rotated by said motor. To provide for equilibrium and vertical support of the car 26, should passengers be seated in one side of the car, there is provided a weighted rack bar 84 slidable transversely of the car in the guide 85 and operated by the pinion 83 on the shaft of the motor 86*a*. When the motor 86 is operated, the shaft 81 is rotated and through the shaft and gear train just described, cross shaft 58 of the bracket mechanism is operated for moving the bell crank lever comprising the legs 61 and 63 in the desired direction for applying the brake drums 56 to the traction wheels 36 and 37. When the links and levers are in the position shown in Figure 8, the brake bands 56 are in their released position, and when these parts are in the position shown in Figure 9, the brake bands are in their applied position.

Reverting to the track structure shown in Figures 11 to 19, it will be observed that the group terminal shown in Figure 11 is provided with switch mechanism including a curved rail section 89 forming a part of the rail loop 15*a* and a track section 90 pivotally supported at one end on a post 1 as shown in Figure 11 and movable into alignment with the

mono-rail 15 providing an extended rail system, as shown in Figure 15. A pair of supporting posts 1 are adjacent the position as shown in Figures 11 and 15 and support upon the horizontal arms 8 thereof, a plate 91 having a sliding interlocking engagement at its opposite ends with said arms and carrying a rail section 89 at its outer side edge. An arched bracket 92 has one end thereof anchored as at 93 to one end of the rail plate 91 and its other end anchored as at 94 to the free swinging end of the rail 90, the rail end 90 carrying a hook 95 to engage the lug 96 shown in Figure 14 upon the rail 15 when these ends are moved into alignment with each other. The other end of the rail 90 is pivotally mounted as at 97 as shown in Figures 11 and 13 to an adjacent rail section of the mono-rail track structure. The rail sections 89 and 90 are simultaneously shifted by the arched bracket connection 92 therebetween and the operating means for the rail sections includes the provision of a pair of rack bars 98 fixed to opposite ends of the rail plate 90 as shown at 99 in Figure 16, the interlocking connections between the ends of the rail plate 91 and the supporting arms 8 being indicated by reference numeral 100 in Figure 16. A shaft 101 journaled at its ends in bearings in the posts 1 carries pinions 102 engaged with the rack bars 98, the operating means for the shaft 101 including a bevel gear 103 fixed thereto and meshing with the bevel pinion 104 upon the upper end of the shaft 105 that is journaled in bracket bearings 106 on the posts 1 as shown in Figures 16 and 17 with the lower end of the shaft 105 carrying a bevel gear 107 meshing with the bevel gear 108 on the shaft of the motor 109. When the motor 109 is operated, the shaft 101 is rotated and the pinions 102, filxed thereto, shift the rack bars 98 in the desired direction for either placing the curved rail section 89 in the wheel loop 15*a*, or displacing the rail section 89 and moving the swinging end of the rail section 90 into alignment with the mono-rail 15*a*.

From the above detailed description of the invention, it is believed that the construction and operation of the present invention will at once be apparent, and while there is herein shown and described the preferred embodiment of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

I claim:—

1. In an elevated electric railway, ground anchored posts, bracket arms on the posts supporting a mono-rail, loading platforms supported on the posts and having stairways leading therefrom to the ground and guard rails set inwardly of the edges of the platform, motor driven cars adapted for mounting on the rails, and means on the upper side of the loading platform outwardly of the guard rails adapted to be engaged by the cars to stabilize the cars during loading and unloading of passengers.

2. In an elevated electric railway, ground anchored posts, bracket arms on the posts supporting a mono-rail, loading platforms supported on the posts and having stairways leading therefrom to the ground, and guard rails set inwardly of the edges of the platform, motor driven cars on the rails and a pair of guide ribs on the loading platforms flaring outwardly at opposite ends and located outwardly of the guard rails adapted to be engaged by the cars to stabilize the cars during loading and unloading of passengers.

3. In an elevated electric railway, ground anchored posts, bracket arms on the posts supporting a mono-rail, loading platforms supported on the posts and having stairways leading therefrom to the ground, motor driven cars on the rails, lugs depending from the side edges of the cars and longitudinally extending guide ribs on the upper face of the platform adjacent the outer edges thereof adapted to be engaged by the car lugs to stabilize the cars during loading and unloading of passengers.

In testimony whereof I affix my signature.

PAUL GALKO.