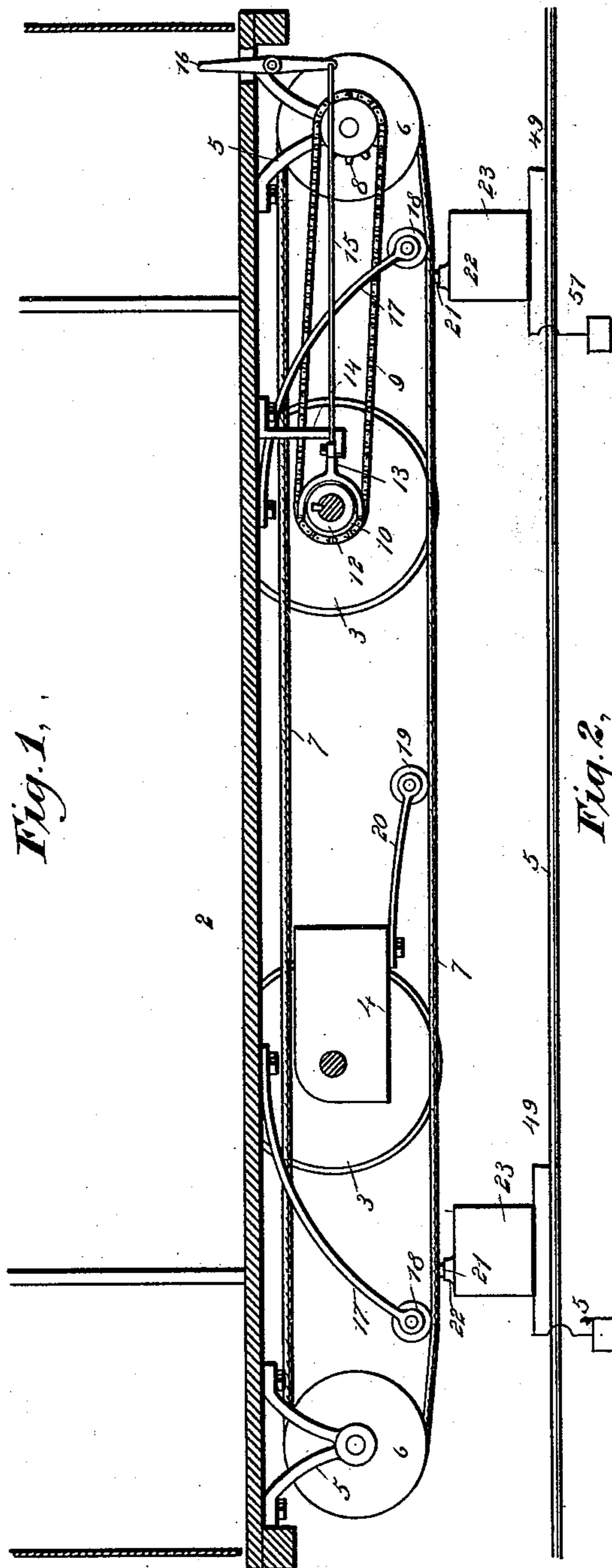


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ELECTRIC RAILWAY SYSTEM.

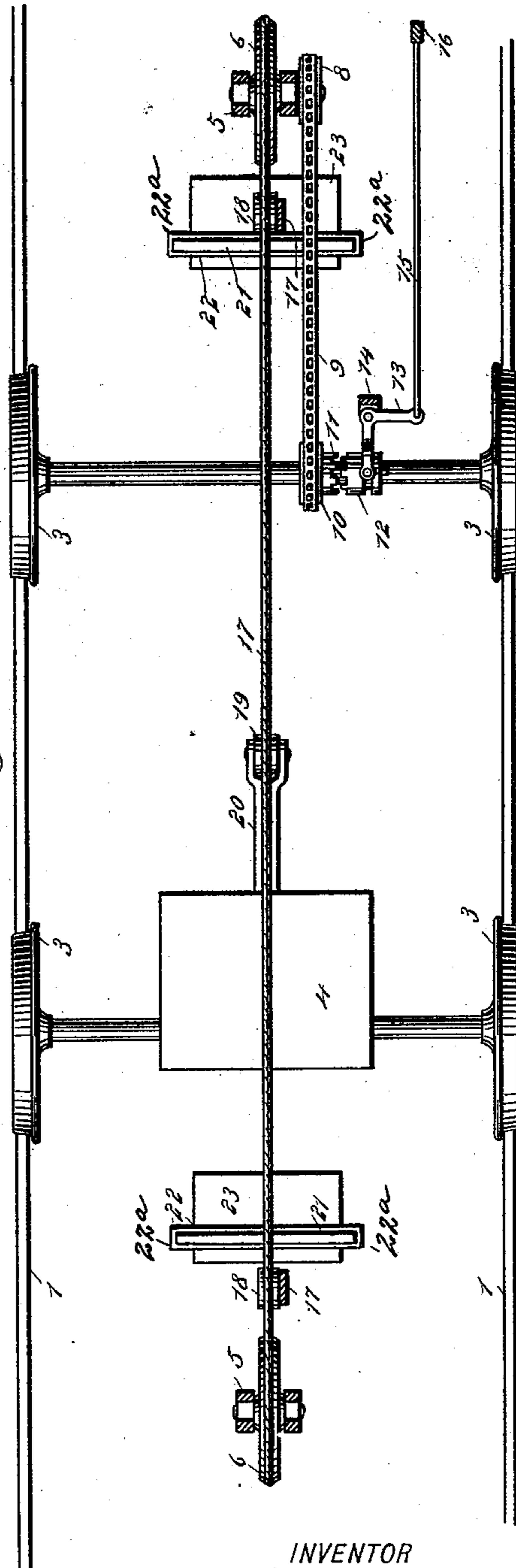
No. 553,736.

Patented Jan. 28, 1896.



WITNESSES:

Edward Thorpe.  
J. B. Caplinger



INVENTOR

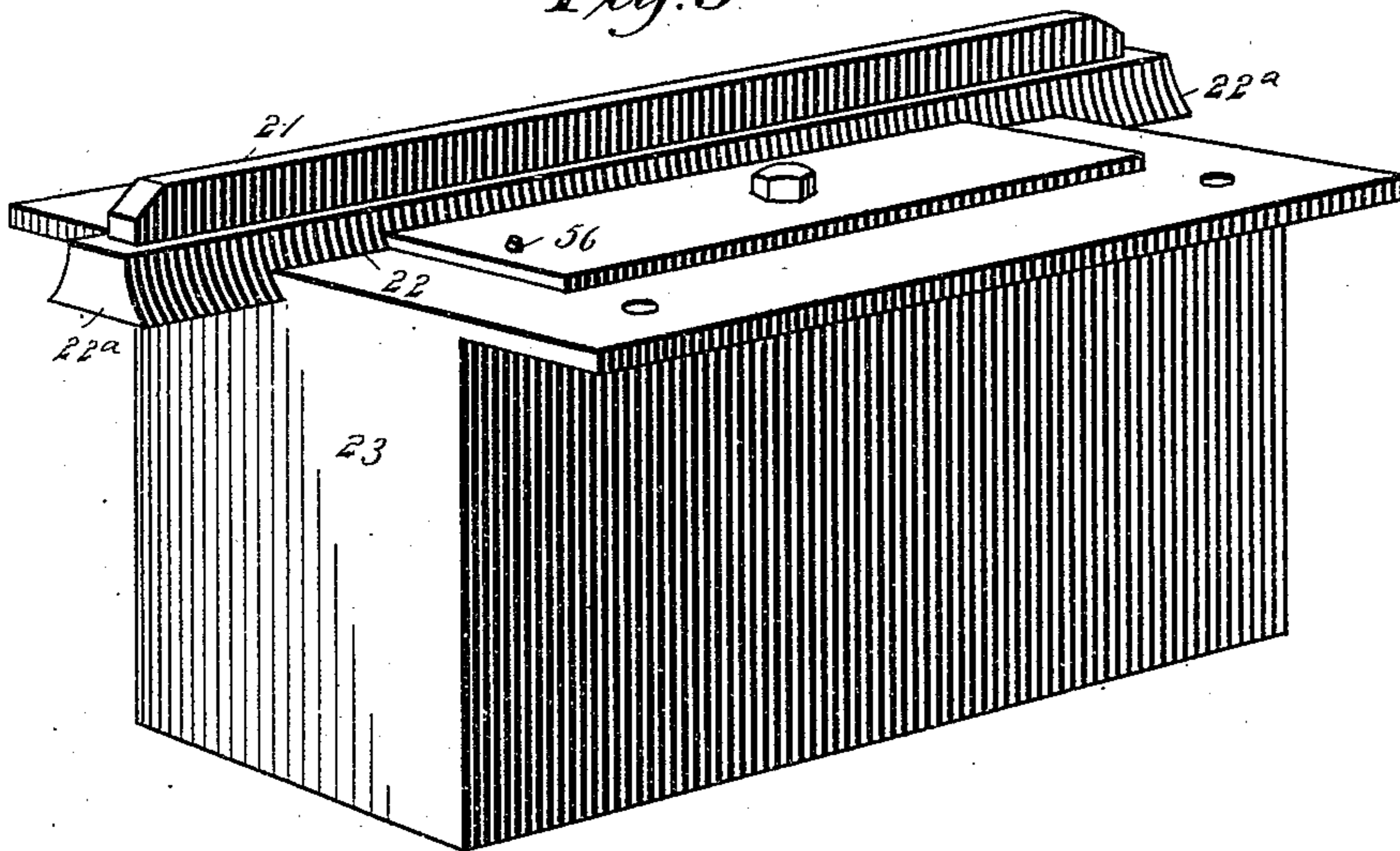
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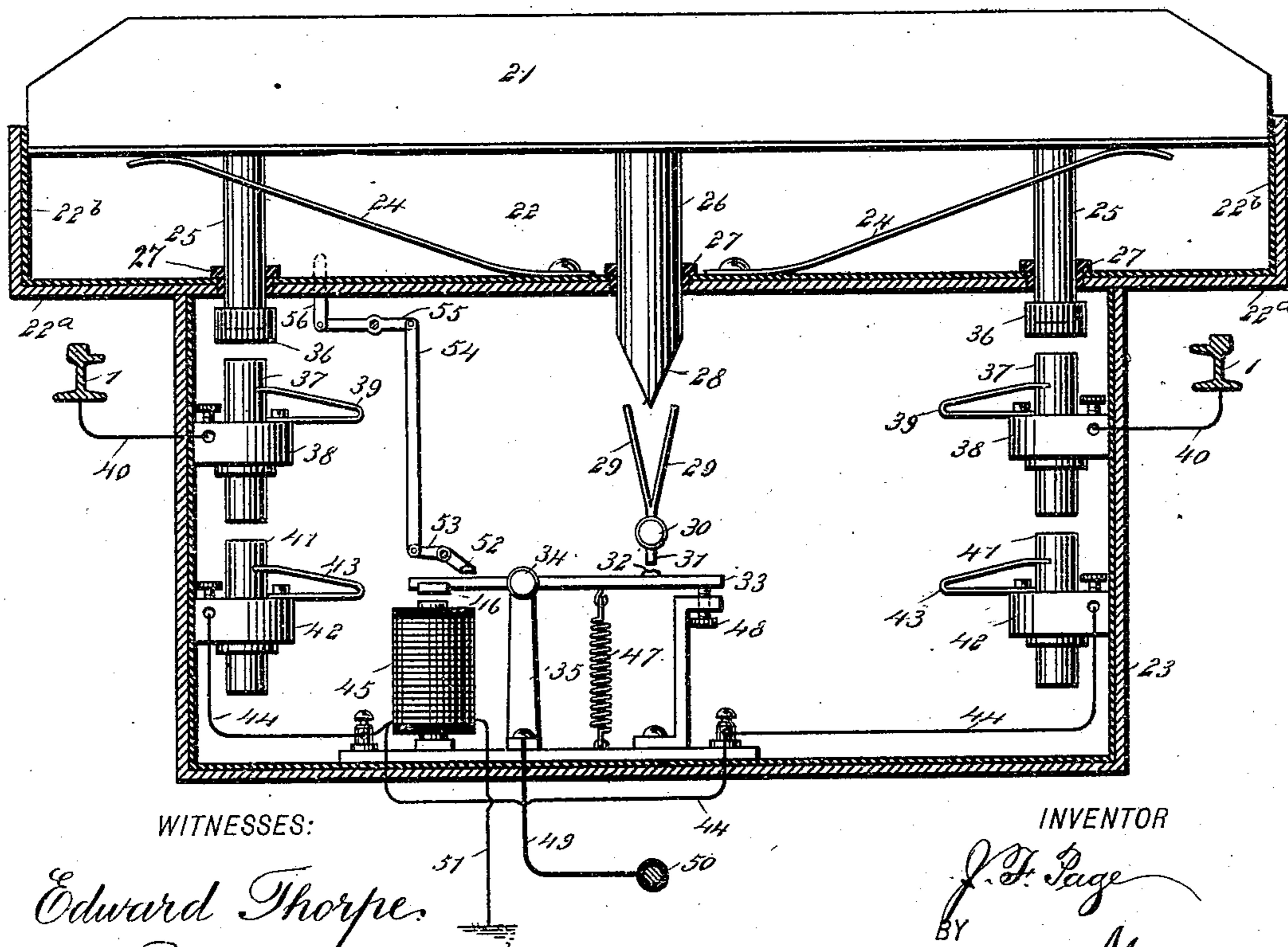
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Patented Jan. 28, 1896.

*Fig. 3.*



*Fig. 4.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN F. PAGE, OF CHEWACLA, ALABAMA.

## ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 553,736, dated January 28, 1896.

Application filed June 28, 1895. Serial No. 554,340. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. PAGE, of Chewacla, in the county of Lee and State of Alabama, have invented certain new and useful  
5 Improvements in Electric-Railway Systems, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in that class of electric-railway systems  
10 wherein the main-line conductor is arranged underground and is provided with a series of feeders or branches, each consisting of a normally-open partial circuit leading to a contact rail or plate and provided with a circuit-  
15 closing device; and the object of the invention is to provide a system of this character of a simple and improved construction.

The invention consists in part in an endless cable or equivalent device carried on the car  
20 and driven by suitable means, said cable being arranged in position to engage and contact with the contact plates or rails in the conduit, whereby the electric current is transmitted through said endless cable to the motor-circuit, and in part to certain improve-  
25 ments in the circuit-closing devices employed for closing the normally-open partial circuits constituting the feeders or branches from the main-line conductor, whereby said circuit-  
30 closing devices are adapted to be actuated by said endless cable.

The invention also contemplates certain other features of construction and combinations of parts whereby certain important ad-  
35 vantages are attained, and the system is made safer and more efficient than other systems heretofore devised, all as will be hereinafter fully set forth.

The novel features of the invention will be  
40 carefully defined in the 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.

45 Figure 1 is a sectional side view showing a section of the line of railway constructed in accordance with my invention, and also showing a motor-car with my improvements applied thereto. Fig. 2 is a plan view of the car-truck, also showing a section of the track  
50 in plan. Fig. 3 is a perspective view showing one of the track boxes or stations arranged

along the line of railway and inclosing the circuit-closing devices; and Fig. 4 is an enlarged vertical section taken longitudinally  
55 through the track box or station shown in Fig. 3, and showing the circuit-closing devices arranged therein.

In the views, 1 represents the track-rails and 2 represents the car having wheels 3 running on said rails and provided with a motor  
60 4 of any kind supported in any preferred manner on its truck. At opposite ends of the car are mounted depending brackets 5, wherein are rotatively mounted grooved  
65 sheaves 6, suitably insulated and aligned with each other and carrying an endless wire cable 7, or equivalent device, said cable being adapted to be driven from one of said sheaves or  
70 pulleys 6, which is provided with a sprocket-wheel 8 secured to its shaft.

A chain or link belt 9 passes over the sprocket-wheel 8 and also over a similar wheel  
10 loosely mounted on one of the car-axes, and having formed integrally with it one  
75 member, 11, of a clutch, the other member, 12, of which is keyed and arranged to slide on the car-axle into and out of engagement with the member 11, being actuated by an elbow-  
80 lever 13, pivoted on a bracket 14 depending from the car and having one arm connected by a link 15 with the lower end of a lever 16  
85 extending up through the car-floor into position to be seized and operated by the motor-

man.  
The cable 7 is normally held at its central  
85 portion slightly below the lower sides of the sheaves or pulleys 6, and to accomplish this I employ oppositely-directed elastic arms 17  
90 mounted on the car and carrying at their extremities rollers 18 to rest on the upper side of the lower half of said cable. The said  
cable is also engaged by a roller or brush 19  
95 mounted on a spring-arm 20 and forming one terminal of the motor-circuit on the car.

The central depressed portion of the cable  
7 between the rollers 18 is adapted to contact with and move contact plates or rails 21  
100 extending transversely on the track at suitable intervals, and these contact plates or rails are movably mounted in chambers 22  
formed at the top of track-boxes 23 set below the surface of the roadway between the rails. The chambers 22 are elongated, as clearly

seen in Figs. 2 and 3, and extend somewhat beyond the ends of the track-boxes 23, as indicated at 22<sup>a</sup>, being lined with rubber or other suitable insulating material, as seen at 22<sup>b</sup> in Fig. 4.

The contact-rails 21 are made to fit snugly in the chambers 22, each being mounted on springs 24 serving to hold it normally in a raised position and provided with vertical guides 25 at its opposite ends, extending through apertures in the top plate of the track-box 23, said apertures being lined with insulating-sleeves 27. At its central part each contact-rail 21 is also provided with a contact-pin 26 projecting downwardly from its bottom through an aperture in the top plate of the track-box lined with an insulating-sleeve 27, and said pin 26 is beveled at its extremity and arranged when the contact-rail is depressed to engage between the forks 29 of a contact strip or spring mounted in a support 30 in the interior of the track-box 23 with its lower end, 31, adapted to engage a contact-point 32 carried by an armature-lever 33 mounted pivotally at 34 on a support 35 in the track-box 23. Each guide-pin 25 has a head or enlargement 36 of insulating material formed at its lower end within the track-box, and serving as a stop to limit the upward movement of the contact-rail 21 under the pressure of springs 24 whereby said contact-rail is held against removal, and when the said contact-rail is pressed down into the chamber 22 said heads or enlargements 36 are adapted to engage and move downwardly contact-slides 37 held to slide vertically in guides 38 in the track-box 23 at opposite sides thereof, being provided with springs 39 serving to hold them normally in an elevated position and being electrically connected by means of short wires or bonds 40 to the respective track-rails 1.

The contact-slides 37 are adapted when depressed to contact with similar slides 41 aligned with them and mounted to slide in guides 42 at opposite sides of the track-box, and also provided with springs 43 arranged to hold them normally raised, and these contact-slides 41 are connected by wires 44 with the coil of a magnet 45, the other end of said coil being connected with a ground-wire 51.

The magnet 45 is arranged to attract an armature 46 mounted on the armature-lever 33, and said armature is normally held away from said magnet by means of a spring 47, and the armature-lever is adjustable by means of a screw 48 set in a bracket in the track-box, as clearly seen in Fig. 4. The main-line conductor 50 extends along the line of railway below the track-boxes 23 and is connected by means of feeders or branches 49 with the post 35 in each box whereon the armature-lever 33 is pivoted.

In order to depress the armature-lever 33, I employ a bent lever 53, pivoted in the track-box 23 and having one end provided with a shoe 52, arranged to engage said armature-lever. The other end of the lever 53 is

coupled by means of a link 54 to one end of a lever 55 pivoted in the track-box 23 near the upper part thereof and connected to a push-pin 56, the upper end of which extends through an aperture in the cover of the track-box, as clearly indicated in Figs. 3 and 4.

The operation is as follows: When it is desired to start the car, the push-pin 56 of one of the track-boxes beneath the car is depressed in any way, preferably by contact with one of the springs 24, so as to move the armature-lever 33 on its pivot, whereby the contact-point 32 will be placed in electrical communication with the end 31 of the forked contact-strip, the forks 29 of which are then engaged by the beveled sides of the lower end, 28, of the contact-pin 26 on contact rail or plate 21, which will be at that time pressed down by means of the cable 7 on the motor-car. The current will then flow from the main conductor 50 through the feeder or branch 49 to post 35, armature 33, contacts 32 and 31, contact-pin 26, contact-plate 21, cable 7, roller 19, spring-arm 20, through the motor 4 of the car, and thence by way of one of the wheels to one or both of the track-rails 1, whence it is conveyed by the wires 40 to slides 37, which being depressed and in contact with the lower slides, 41, permit said current to flow through the coils of the magnet and to the earth by way of wires 44 and 51, thereby exciting the magnet so as to hold the armature 46 depressed and the contact-points 32 and 31 in contact with one another. The car in passing off each of the track-boxes permits the contact rail or plate 21 to rise under the influence of its springs 24, so as to automatically break the circuit on opposite sides of said contact-plate—that is, in both the main or leading and the return conductor—whereby it will be seen that a perfect insulation of the contact-plates is maintained at all times except when the car is directly over the contact-plate. Moreover the construction is such that should the connection between either of the rails and its respective contact-slides 37 and 41 be impaired, the other contact-slides will answer to do the work required, or should both sets of these devices become inoperative for any reason so that the return current would fail to reach magnet 45 to except the same the armature-lever 33 may be operated by means of the push-pin 56 independent of the electrical devices. The contact rails or plates 21 will be arranged so as to project slightly above the roadway, and the cable 7 will be driven in a direction opposite to that in which the car moves, so that chafing or wearing of the parts will be prevented as much as possible. The central part of the cable being depressed slightly by means of the spring-arms 17 prevents the sheaves or pulleys 6 from coming in contact with the contact-plates 21, whereby said pulleys might be broken, and this arrangement also provides a yielding spring-pressure for actuating said contact plates or rails.

It will be evident from the above description that some modification may be made in the construction and arrangement of the various parts without material departure from the principles of my invention, and for this reason I do not wish to be understood as limiting myself to the precise embodiment of the invention herein set forth.

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

1. In an electric-railway system, the combination of a track, a feed-wire having a series of normally-open branches terminating in contact-plates, suitably located along the track, a return-conductor having two sets of normally-open branches connected respectively to the respective track-rails, and means for closing the circuit through the respective branches of the feed and return conductors, substantially as set forth.

2. In an electric-railway system, the combination of a feed-wire having a series of branches each including two contact-points, a contact-plate movably mounted on the track adjacent to each of said branches and adapted when moved to connect with one of said contact-points, and means actuated by said contact-plate for closing the circuit between said contact-points, substantially as set forth.

3. In an electric-railway system, the combination of a feed-wire, a branch extending from said feed-wire and having two contact-points, a depressible contact-plate mounted adjacent to the branch and adapted when depressed to be connected to one of the contact-points, and means actuated by the movement of the contact-plate for closing the circuit between said contact-points, substantially as set forth.

4. In an electric-railway system, the combination of a feed-wire, having a branch provided with two contact-points, a movable contact-plate adapted to be connected to one of the contact-points, a return-conductor having a branch including two contact-points and the coils of a magnet, an armature for said magnet adapted when moved to close the circuit between the two contact-points of the feed-wire branch, and means actuated by the movement of the contact-plate for closing the circuit between the contact-points of the return-conductor branch, substantially as set forth.

5. In an electric-railway system, the combination of a feed-wire, having a branch provided with two contact-points, a depressible contact-plate adapted when depressed to connect with one of said contact-points, a return-conductor having a branch including two contact-points, and the coils of a magnet, an armature for said magnet adapted when moved to close the circuit between the two contact-points of the feed-wire branch, and means actuated by the depression of said contact-plate for closing the circuit between the con-

tact-points of the return-conductor branch, substantially as set forth.

6. In an electric-railway system, the combination of a feed-wire having a branch provided with two contact-points, a contact-plate adapted when moved to be connected to one of the contact-points, a return-conductor having two branches extending to the respective track-rails and each including two contact-points, said return-conductor including the coils of a magnet, an armature for said magnet, adapted when moved to close the circuit between the contact-points of the feed-wire branch, and means actuated by the movement of the contact-plate for closing the circuit between the contact-points of the respective return-conductor branches, substantially as set forth.

7. In an electric-railway system, the combination of a feed-wire having a branch provided with two contact-points, a contact-plate connected to one of the contact-points, means actuated by the motor-car for closing the circuit between said contact-points, and additional means independent of the car for closing the circuit between said contact-points, substantially as set forth.

8. In an electric-railway system, the combination of a feed-wire having a branch provided with two contact-points, a contact-plate adapted to be connected with one of said contact-points, a return-conductor including the coils of a magnet, an armature for said magnet adapted when moved to close the circuit between said contact-points, and means independent of said magnet for moving said armature, substantially as set forth.

9. In an electric-railway system, the combination of a feed-wire having a branch provided with two contact-points, a movable contact-plate adapted to be connected to one of said contact-points, a return-conductor having a branch including two contact-points and the coils of a magnet, an armature for said magnet adapted when moved to close the circuit between the contact-points of the feed-wire branch, means actuated by the movement of the contact-plate for closing the circuit between the contact-points of the return-conductor branch, and additional means for moving said armature, substantially as set forth.

10. In an electric-railway system, the combination of a track-box, a movable contact-plate having a central contact-pin, and guides on opposite sides thereof extending into said track-box, circuit connections in said track-box adapted when the contact-plate is moved to close the circuit and connect the contact-plate with the feed-wire, and heads of insulating material on said guides, substantially as set forth.

11. In an electric-railway system, the combination of a track-box having a chamber on its top, a depressible contact-plate located in said chamber and having a contact-pin ex-

tending into the track-box, circuit connections in the track-box adapted when the contact-plate is depressed to connect the same to the feed-wire, and a spring arranged under  
 5 said contact-plate in the chamber in the top of the track-box and adapted to hold the contact-plate normally in an elevated position, substantially as set forth.

12. In an electric railway, in combination  
 10 with a series of movable contact-plates located along the track and adapted when moved to be connected to the main feed-wire, a motor-car having an endless cable connected in circuit with its motor and adapted to contact  
 15 with and move said contact-plates, substantially as set forth.

13. In an electric railway, the combination of a motor-car, sheaves mounted to rotate at the ends thereof, an endless cable carried on

said sheaves, means for driving said cable, 20 and means for elastically depressing the central portion of said cable below said sheaves, substantially as set forth.

14. In an electric-railway system, the combination of a motor-car, aligned sheaves mounted to rotate in vertical planes at opposite ends  
 25 thereof, an endless cable carried on said sheaves, means for driving said cable, and spring-actuated rollers supported on the car independent of said cable and arranged to  
 30 bear on the lower half of said cable between the sheaves, whereby the central portion thereof is depressed, substantially as set forth.

JOHN F. PAGE.

Witnesses:

N. P. RENFRO,  
 E. E. McCALL.