

**No. 649,990.**

Patented May 22, 1900.

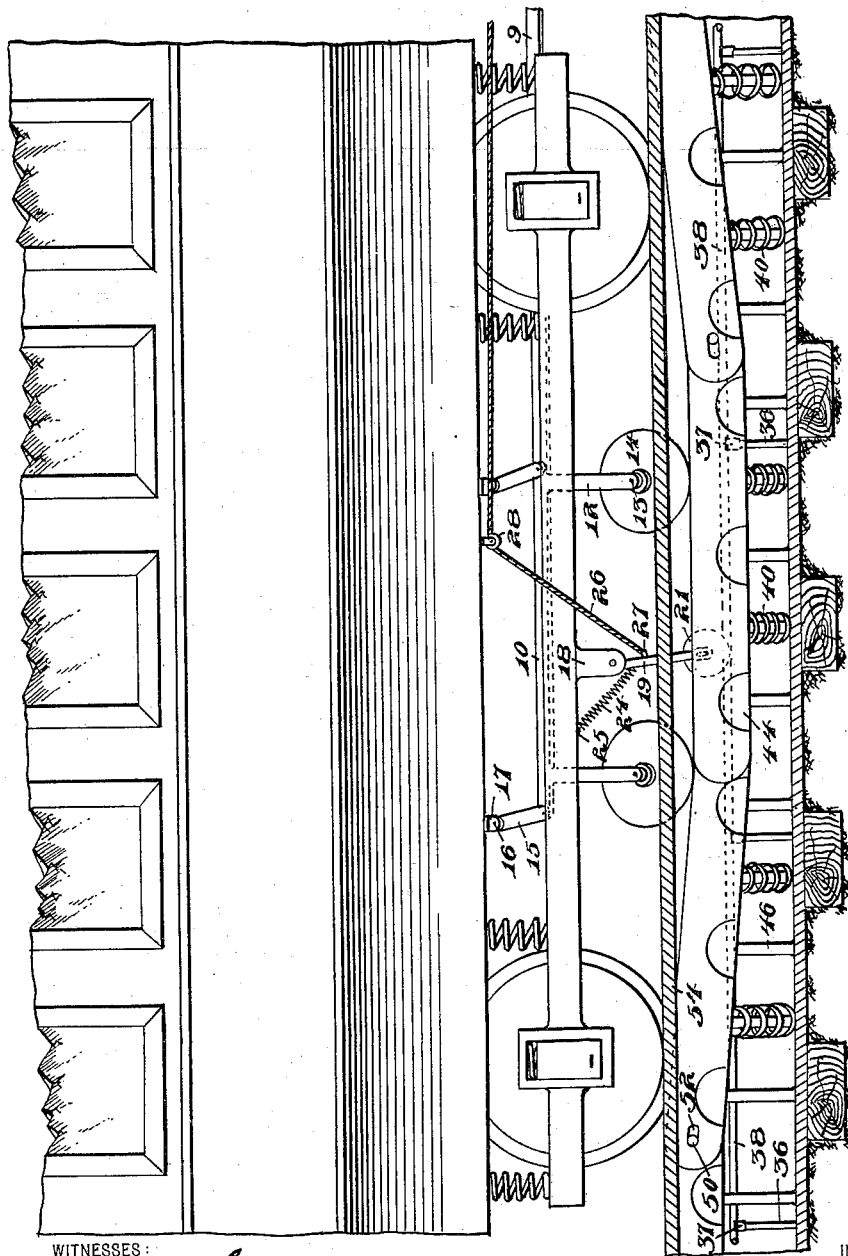
**J. B. LARKIN.**

UNDERGROUND ELECTRIC RAILWAY SYSTEM.

(Application filed Sept. 9, 1899.)

5 Sheets—Sheet 1.

(No Model.)



WITNESSES

WITNESSES:  
J. P. Appleman,  
do do Haymaker.

1739.1

INVENTOR

John B. Larkin

BY

BY *N. C. Everett & Co.*  
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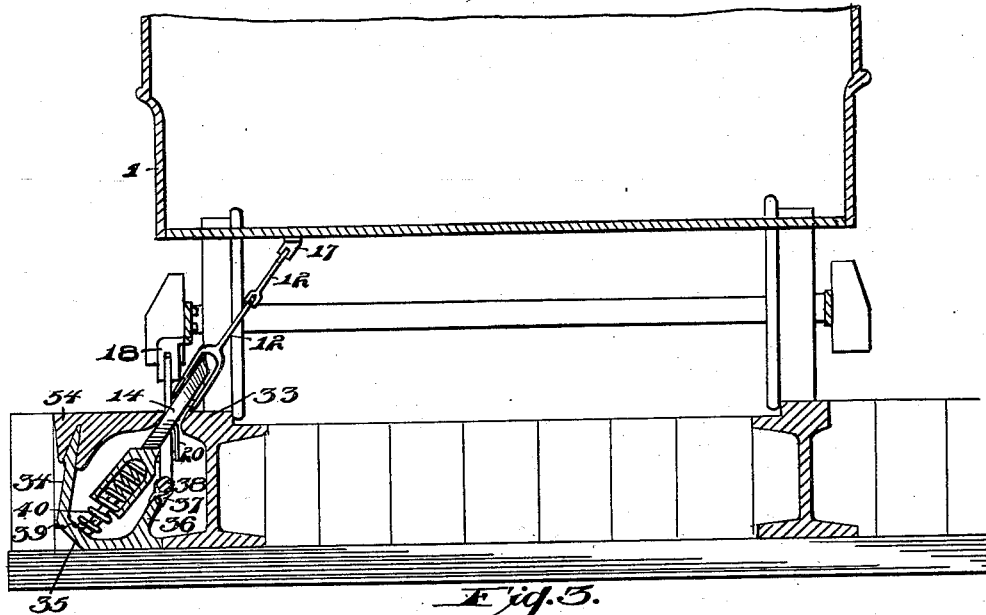
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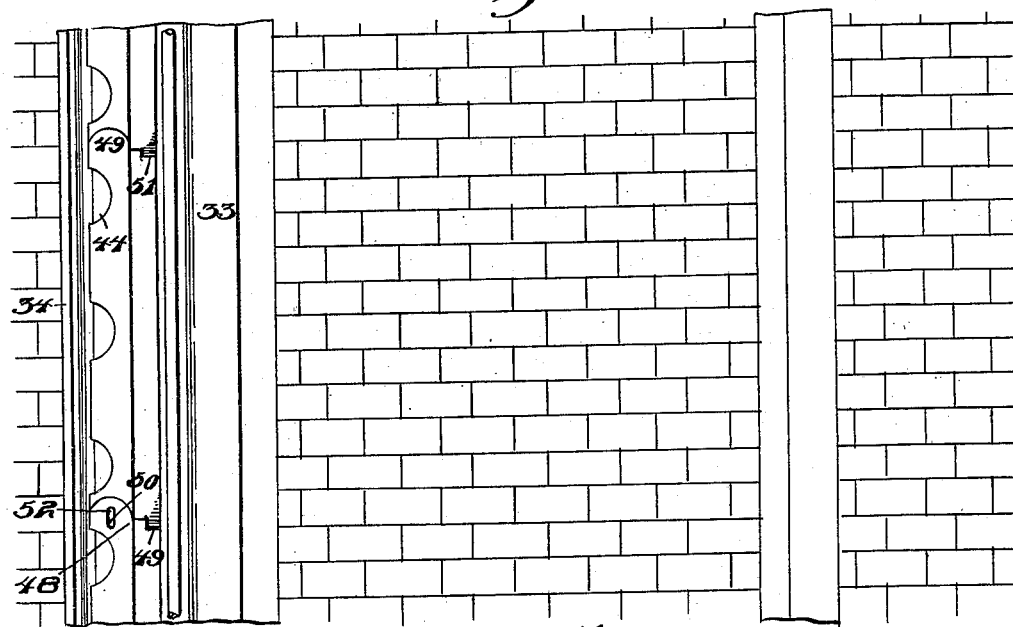
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*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



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UNDERGROUND ELECTRIC RAILWAY SYSTEM.

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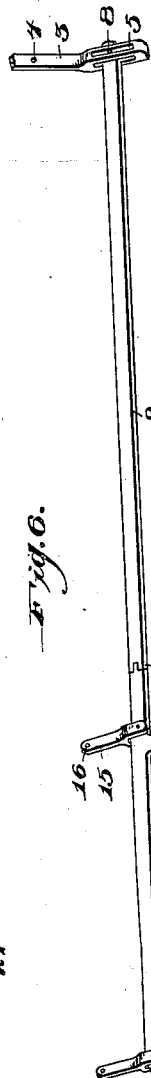
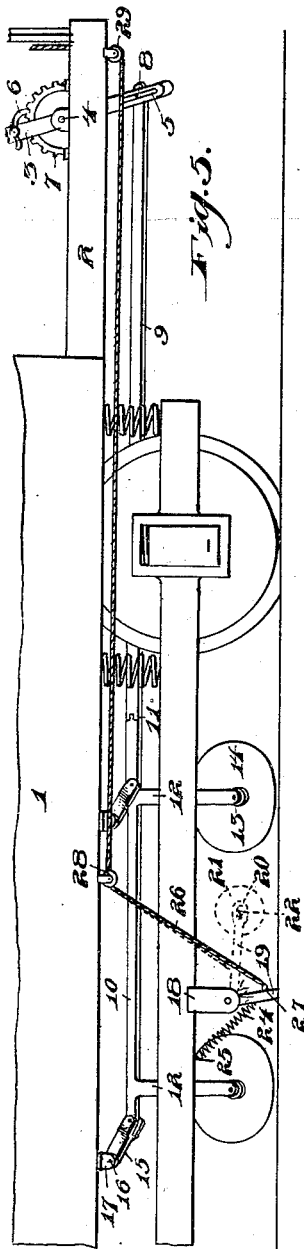
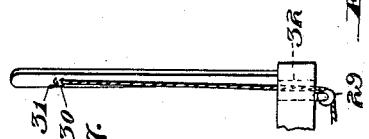
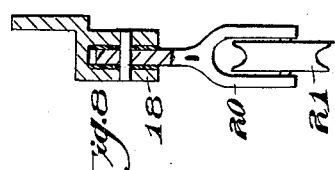
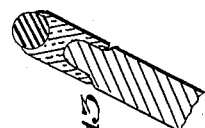
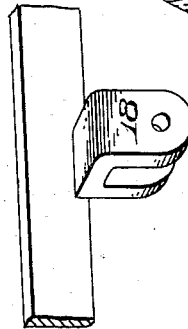
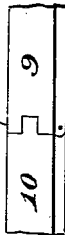


Fig. 11.

Fig. 10.

Fig. 9.



WITNESSES:

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No. 649,990.

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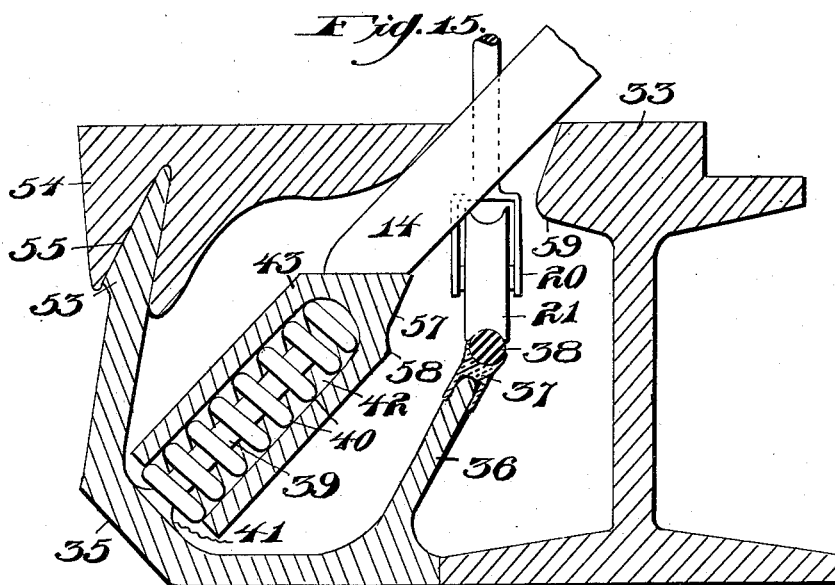
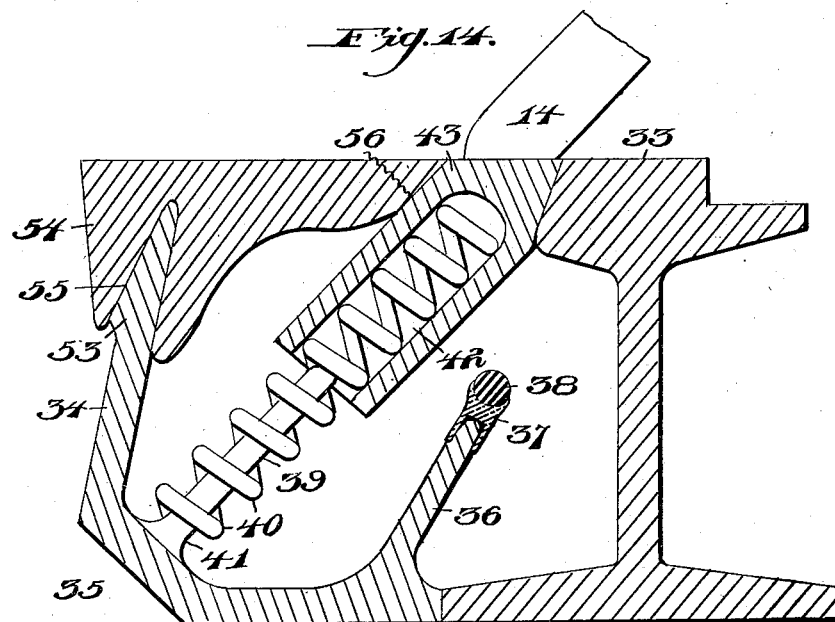
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UNDERGROUND ELECTRIC RAILWAY SYSTEM.

(Application filed Sept. 9, 1899.)

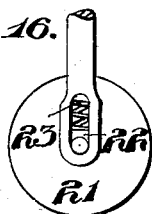
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5 Sheets—Sheet 4.



WITNESSES:  
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*C. M. [illegible]*

*Fig. 16.*



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Fig. 17.

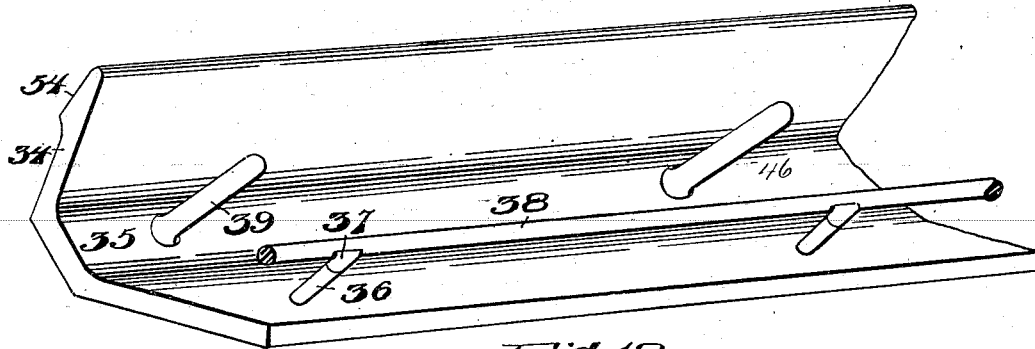


Fig. 18.

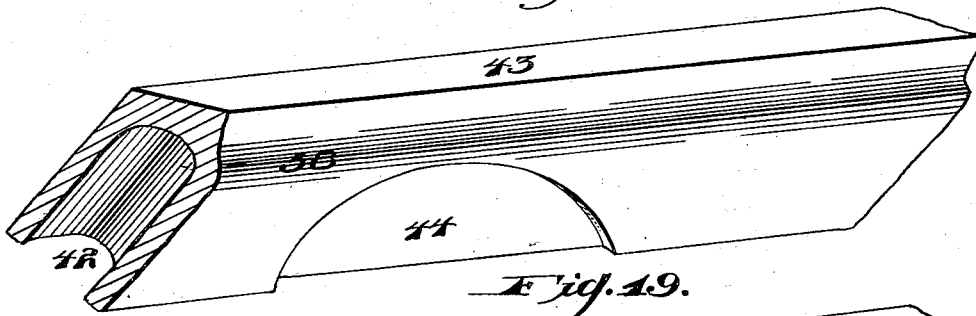


Fig. 19.

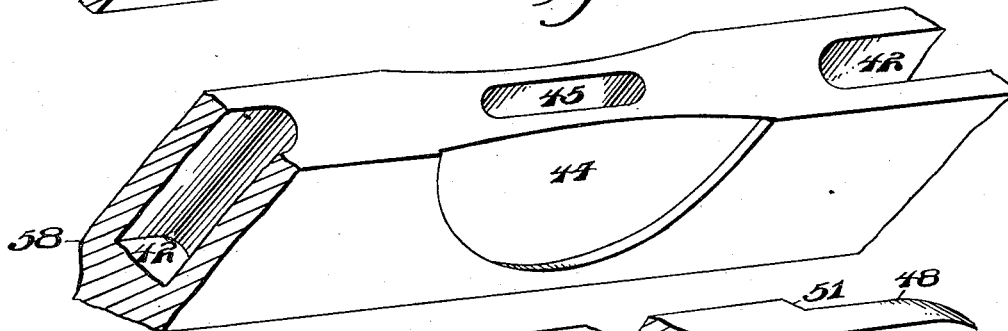
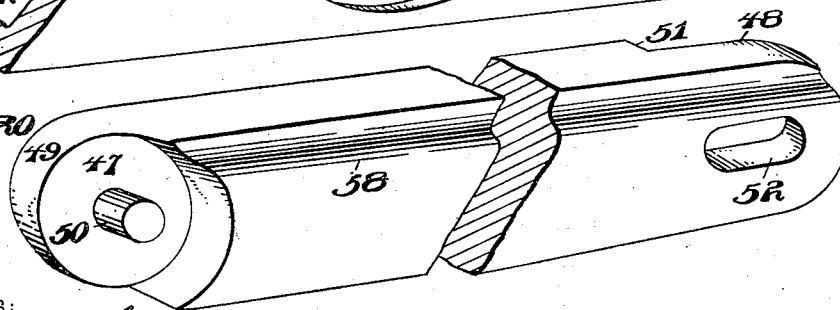


Fig. 20.



WITNESSES:

J. S. Appleman.  
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# UNITED STATES PATENT OFFICE.

JOHN B. LARKIN, OF PITTSBURG, PENNSYLVANIA.

## UNDERGROUND ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 649,990, dated May 22, 1900.

Application filed September 9, 1899. Serial No. 729,942. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN B. LARKIN, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Underground Electric-Railway Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in systems for underground electric railways, and more particularly to subsurface conduits for electric conductors in which a traveling connection is established and maintained between the moving car and the closed and protected supply-conductor by a contact device moving with the car and extending through the surface-slot in the conduit, and has for one object the provision of novel means whereby the entire electric feed-wire is conducted underground.

The present invention has for a further object the placing of the conduit in a position adjacent to the rails that will not interfere in any way with the ordinary traffic, and, furthermore, to provide novel means whereby the slot leading to said conduit will be easily opened through the medium and arrangement of novel mechanism attached to the moving car.

The invention further aims to provide an automatic slot-closer that will resist and form a lock against any direct downward pressure that may be brought to bear upon the same and, furthermore, act as a guard to prevent the entrance to the conduit of water, ice, snow, dirt, and other substances that would otherwise tend to clog the slot and interfere with the successful operation of the system.

The herein-described invention further contemplates to construct a shallow conduit adjacent to and extending in alinement with the outer rails of the tracks, the depth of said conduits being equal to the height of the rail, the latter forming one of the walls of said conduits, thereby making it possible to arrange the mechanism within a comparatively-contracted space and greatly reduce the cost of construction.

Various details of construction enter into

my invention; but the practical and preferred form of the same is shown in the accompanying drawings and will be specifically described and then particularly pointed out in the appended claims.

Figure 1 is a side elevation of a portion of a car provided with my improvements and showing the underground conduit in vertical section for the purpose of illustrating more clearly the novel mechanism arranged therein. Fig. 2 is a transverse vertical sectional view of the same. Fig. 3 is a plan view of the road-bed as it appears with the cover of the conduit removed therefrom. Fig. 4 is a perspective view in detail of the slot-closer as it is employed for curves of the track. Fig. 5 is a side elevation of the truck of a car, the lower portion of the car having my improvements attached thereto. Fig. 6 is a perspective view of the lever and connection for operating the depressing-wheels of the slot-closer. Fig. 7 is a side elevation of the fender of the car, showing the end of the operating-cable attached thereto. Fig. 8 is an enlarged detail front elevation of the trolley. Fig. 9 is an enlarged perspective view of one of the hangers carrying the lever and connection for operating the depressing-wheels of the slot-closer. Fig. 10 is a similar view of the bifurcated link connecting the operating-lever of the slot-closer. Fig. 11 is a similar view showing the manner of connection of the two sections of the lever operating the slot-closer. Fig. 12 is a similar view showing in dotted lines the operation of the hinge connections when the car is swaying or is traveling over curves or switches. Fig. 13 is a vertical sectional view of the insulated end of one of the pins for carrying the feed-wire. Fig. 14 is an enlarged transverse vertical sectional view of the conduit, showing the slot-closer in its normal position. Fig. 15 is a similar view showing the slot-closer depressed and as it appears when the car is traversing over the same. Fig. 16 is a detail view of the trolley-wheel and harp. Fig. 17 is a perspective view of one of the sections of the conduit. Fig. 18 is a perspective view of one of the sections of the slot-closer. Fig. 19 is an inverted view of the same. Fig. 20 is one of the connecting-links of the slot-closer.

In the drawings the reference-numeral 1

indicates the body portion of the car, and 2 the platform of the same, upon said platform being arranged a lever 3, which is pivotally connected at 4 and extends through the bottom of the platform, said lever having a slotted-end, as shown at 5, and carries a gravity-pawl 6, which is adapted to engage in a segmental tooth-rack 7, arranged upon the platform 2 of the car. The slotted end 5 of the said lever 3 is adapted to engage a pin 8, provided with a suitable head, said pin being attached to the free end of the operating-lever, this lever being composed of two parts 9 and 10 and the engaging ends 15 thereof forming a hinge connection 11 between said parts. The part 10 is further provided with downwardly-extending arms 12, upon which are mounted at 13 depressing-wheels 14 of the slot-closer. The section 10 of the operating-lever is further provided with bifurcated links 15, which are pivotally secured thereto and are adapted to be pivotally connected at 16 to hangers 17, the latter being rigidly secured to the under side of 25 the car.

It will be noted that in the construction of the operating-rod, arms, depressing-wheels, hangers, and links they are all set at an angle of from thirty degrees to forty-five degrees to 30 the under side of the car.

The reference-numeral 18 represents a hanger rigidly secured to the truck of the car, in which is pivotally mounted an arm 19, forming a harp 20 at its lower extremity, 35 in which is secured a trolley-wheel 21, said harp being slotted, as shown at 22, carrying a spiral spring 23, operating in the bearing of the trolley-wheel. A spiral spring 24 is secured at one end to the arm 19 and fastened 40 at its other end to the under face of the truck, as shown at 25. An operating cord or cable 26 is secured at 27 to the other end of said arm 19, this cord or cable passing over the pulley 28, arranged to the underneath side 45 of the car in a suitable hanger, and thence over a pulley 29, arranged to the under side of the platform in a like manner.

The reference-numeral 30 represents a loop formed at the free end of the said cord or 50 cable 26, which is adapted to be held and engage a hook 31, placed in the inner side of the fender. The operating cord or cable also passes through the platform of the car, as shown by the reference-numeral 32 in Fig. 7 55 of the drawings.

Referring now to the conduit and mechanism arranged therein, the reference-numeral 33 represents the rail, and 34 the casing, said casing forming the side 35, extending at an angle to the bottom and sides thereof, and is provided interiorly with an upwardly-extending 60 portion 36, the end of said upwardly-extending portion being provided at suitable intervals with an insulator 37, upon which is arranged 65 the feed-wire 38. The interior face of the angle side 35 is provided with guide-posts 39, the latter being encircled by a spiral spring

40, the lower end of said spring being securely fastened at 41 to the lower end of the guide-posts 39 and extends upwardly at an angle in 70 the recess 42, formed in the sections of the slot-closer 43, said sections having their sides cut away, as shown at 44, and are further provided with recesses 45, adapted to receive guide-pins 46, which extend through the angular sides 35 of the conduit and extend at 75 the same angle as the guide-posts 39. The ends of the sections of the slot-closer also carry a male member 47 and a female member 48, said male member consisting of a head 80 49, carrying a pin 50, said head 49 being adapted to fit against the cut-away portion 51 and the pin 50 engaging the slot 52. The upper extremity of the casing 34 also extends at a slight angle and terminates in a wedge-shaped portion 53, said wedge-shaped portion 85 53 being adapted to receive a removable cover 54, having formed in its under face a recess 55 to correspond with the wedge-shaped portion 53 of the casing. This cover 54 is also 90 beveled, as shown at 56, and forms the one side of the slot, this bevel being formed to correspond with the angle at which the slot-closer is depressed and operates. The sections of the slot-closer are also slightly beveled at one side, as shown at 57, forming a 95 shoulder 58, the latter being adapted to abut against the side of the rail 59 and limit the upward movement of the slot-closer.

It will be noted that all the parts and mechanism connected with the heretofore described invention may be easily accessible if 100 they should become out of adjustment, and in case any of the parts are broken they can be easily replaced at a comparatively-small cost. 105

The operation of my improved system for underground electric railways is as follows, and in order to clearly illustrate the operation I will, first describe the movement and function of the depressing-wheels: These wheels 110 are operated through the medium of the lever 3, extending upwardly through the platform of the car, this lever 3 being pressed forwardly, which operation imparts a rearward and downward movement to the operating-lever 9, a downward movement being 115 permitted by the pin 8 sliding downwardly in the slotted end 5, the rearward movement being permitted by the bifurcated links 15, the latter also limiting the downward movement 120 of the operating-lever 9, this lever 9 carrying with it the downwardly-extending arms upon which the depressing-wheels 14 are mounted. This operation will tend to depress the wheels 14 against the upper face of the 125 slot-closer and depress the same at an angle, as shown in Fig. 2 of the drawings. The depressing-wheels partly enter the conduit and depress the sections of the slot-closer, thereby depressing the spiral spring 40 and allowing 130 a slight expansion of the slot-closer, which will be equal to the length of the slot 52, formed in the connecting ends of the sections. As the car traverses over the sections of the

slot-closer the sections will again return to their normal position by reason of the spiral spring 40, and by this means only a few sections of the slot-closer will be in operation, the slot being closed both in front of and in the rear of the car. As the sections of the slot-closer are depressed the guide-pins will further serve to accurately guide and return the slot-closer to its proper position in the slot.

The operation of the trolley is as follows: The trolley has a direct downward movement and is not set at an angle, as the depressing-wheels, the trolley being operated by means of the cord or cable, the one end of which is suspended from a hook 31, arranged to the front of the car. As this cord or cable is drawn taut the arm 19 will be raised out of the slot, thereby disengaging the trolley-wheel from the feed-wire and allowing the depressing-wheels to be raised when the occasion requires. In order to engage the trolley again with the feed-wire, the depressing-wheels are lowered to their normal position and the free end of the cord or cable is disengaged from the hook, allowing the spiral spring 24 to return the trolley-wheel to its normal position. In order to allow and compensate for any irregularities that may be found in the feed-wire, the trolley-wheel is mounted in a movable bearing, the springs 23 serving to take up the jar which would otherwise be occasioned by such unevenness or irregularity of the wire and, furthermore, assuring a constant contact of the trolley-wheel with the feed-wire.

It will be readily understood that by the peculiar construction and shape of the slot and slot-closer a perfect lock will be formed against any direct downward pressure upon the upper face of the slot-closer, and in order to open the slot a pressure is required equal to the operating-lever 9 and arms 12, that are set at an angle.

In Fig. 4 of the drawings I have illustrated the slot-closer as used for curves, and a comparatively-short curve can be constructed with my improved system, the operation of the mechanism when traversing the curve being substantially the same as traveling over the other course. In case a switch, railroad-crossing, or other obstruction is met the trolley-wheel and the depressing-wheels may be lifted out of the slot by the described mechanism, as heretofore stated, the momentum of the car carrying the same over the obstruction, when the trolley and depressing wheels may be lowered to resume their functions.

Particular attention is directed to the fact that various changes may be made in the details of construction without departing from the general spirit of my invention. For example, I do not wish to limit myself to the position of the conduit adjacent to the rail, as the same may be placed adjacent to the inner or outer rail or in the center between

the tracks, nor do I wish to limit myself to operating the slot-closer at an angle from the car, as by a slight alteration of the parts herein shown and described the slot-closer may be operated vertically.

It will also be understood that various changes may be made in the construction of the mechanism arranged to the car suspending the depressing-wheels without departing from the fundamental ideas and objects sought to be attained by the present invention.

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

1. The combination, with a suitable conduit adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to receive a trolley-arm to enter the conduit and engage said electric conductor, a slot-closer set at an angle and formed of sections adapted to operate in said slot, and yielding supports for said slot-closer arranged to hold said sections in said slot and permitting them to be moved downwardly and out of the slot and into the conduit as the car passes over the slot, substantially as described.

2. The combination, with a suitable conduit arranged adjacent to one of the rails of a track and containing an electric conductor and provided with a longitudinal slot or opening adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections, yielding supports set at an angle for the said slot-closer and adapted to hold the same in the said slot and permitting it to be moved downwardly and out of the slot and into the conduit as the trolley-arm passes along the slot, substantially as described.

3. The combination, with a suitable conduit arranged adjacent to one of the rails of a track and adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections, yielding supports and guide-pins set at an angle and arranged to hold said sections in said slot and permitting them to be moved downwardly out of the slot and into the conduit as the trolley-arm passes along the slot, substantially as described.

4. The combination, with a suitable conduit adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to permit the trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections, guide-posts set at an angle and carrying yielding supports for said sections, and means carried by the said car to depress the said slot-closer, substantially as described.

5. The combination, with a suitable conduit arranged adjacent to the rail adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to per-



mit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections, guide-posts set at an angle and carrying yielding supports for said slot-closer, depressing-wheels suspended from the car adapted to move the slot-closer downwardly, substantially as described.

6. The combination, with a suitable conduit adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer set at an angle and formed of sections, means formed integral with each of the said sections for suitably connecting the same together, yielding supports adapted to hold the said slot-closer, said supports and slot-closer operating at an angle in said conduit, substantially as described.

7. The combination, with a suitable conduit arranged adjacent to the rail adapted to contain an electric conductor and provided with a slot extending in alinement with said rail adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer set at an angle and mounted upon yielding supports, and means carried by the car whereby the said slot-closer is depressed at an angle in said conduit, substantially as described.

8. The combination, with a suitable conduit arranged adjacent to the outer rail adapted to contain an electric conductor and provided with a slot extending in alinement with said rail adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections mounted upon yielding supports, said supports being arranged at an angle in said conduit, and depressing-wheels arranged on the car adapted to depress said slot-closer at an angle and into the said conduit as the car passes along the slot, substantially as described.

9. The combination, with a suitable conduit adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to receive a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of sections adapted to operate in said conduit, guide-posts arranged at an angle for the said slot-closer, yielding supports for said slot-closer arranged to hold the said sections in said slot and permitting them to be moved downwardly and upwardly in said conduit as the car passes along said slot, and means for limiting the upward movement of the said slot-closer, substantially as described.

10. The combination, with a suitable conduit arranged adjacent to the rail containing an electric conductor and provided with a slot extending in alinement with said rail adapted to permit a trolley-arm to enter the conduit and engage the said electric conductor, a slot-closer formed of yielding hinged sections and arranged to operate at an angle, yielding supports for said slot-closer to hold the same in

the said slot and permitting it to be moved downwardly and upwardly by means of mechanism suspended from the car as the same traverses along the slot, substantially as described.

11. The combination, with a suitable conduit adapted to contain an electric conductor and provided with a longitudinal slot or opening adapted to receive a trolley-arm to enter the conduit and engage said electric conductor, a slot-closer formed of yielding hinged sections, depressing-wheels adapted to be raised and lowered from the body of the car to engage said slot-closer and move the same downwardly, and means suspended from the car to raise and lower the said trolley-arm independently of the said depressing-wheels, substantially as herein shown and described.

12. In a system of the character described, the combination of a conduit having one of its sides formed by a rail-section of a track and a casing having one of its sides set at an angle and arranged adjacent to the said rail, a removable cover for the said casing, said cover and rail-section so arranged that the sides thereof will form a longitudinal slot, and means adapted to operate at an angle for opening and closing the said slot, substantially as described.

13. In a system of the character described, the combination of a conduit formed of a casing having one of its sides set at an angle, a removable cover, a rail so arranged as to form a slot between said removable cover and the rail, guide-posts arranged in the said casing, and means arranged upon said guide-post and adapted to operate at an angle for retaining a slot-closer within the said slot, substantially as set forth.

14. In a system of the character described, the combination of a conduit formed of the rail, a casing having one of its sides set at an angle and carrying yielding connections, a slot-closer mounted on said yielding connection, a removable cover arranged on said casing, said slot-closer adapted to operate between said rail and cover, substantially as set forth.

15. In a system of the character described, the combination with a conduit formed of a casing having one of its sides set at an angle and having mounted thereon a slot-closer and a yielding connection, substantially as set forth.

16. In a system of the character described, a suitable conduit formed of the rail, a casing having one of its sides set at an angle, said side carrying a guide-post and yielding connection, and a slot-closer formed of sections, substantially as set forth.

17. In a system of the character described, a conduit formed of the rail, a casing having one of its sides set at an angle carrying a guide-post, a spring encircling said guide-post and operating in the slot-closer, a removable cover secured on said casing forming a slot between said cover and rail, substantially as set forth.

18. The combination, with the slotted conduit, of a continuous slot-closer formed of sections operating at an angle and adapted to close the slot in the conduit, and the series of yielding supports engaging said sections and holding them in said slot until said sections are moved down out of the slot, so as to permit the trolley-arm passing along in the slot to engage the electric conductor supported in said conduit, substantially as described.

19. The combination, with the slotted conduit adapted to contain an electric conductor directly below and in alinement with said slot in the conduit, a slot-closer arranged at an angle so that when forced downwardly will be out of alinement with said slot and said electric conductor allowing the trolley-arm to operate vertically in said slot, and means for limiting the upward movement of the said closer, substantially as described.

20. The combination, with the slotted conduit, of a continuous slot-closer formed of hinged sections and arranged at an angle, and a series of yielding supports engaging said sections to permit said sections to be moved downwardly and upwardly at an angle in said conduit so as to permit the trolley-arm passing down vertically in said slot to engage the electric conductor supported in said conduit, substantially as described.

21. The combination, with the slotted conduit, of a slot-closer formed of hinged sections adapted to close the slot in the conduit, yielding supports set at an angle engaging said slot-closer in the conduit, a car, a conductor arranged in said conduit, depressing-wheels arranged upon said car, means whereby said depressing-wheels are raised and lowered adapted to engage the upper face of said slot-closer, and an arm extending from the car and carrying a trolley device adapted to engage said conductor in the conduit, substantially as described.

22. In an underground railway system, the combination of a conduit formed of a casing and one of the rail-sections of the track, a removable cover for the said casing, and so arranged as to form a slot between the same and said rail, a series of guide-posts arranged at an angle in the said casing, and a spring-actuated slot-closer formed in sections and operating at an angle, substantially as described.

23. In an underground railway system, the combination of a conduit provided with a longitudinal slot, a series of guide-posts arranged in the said conduit, a spring-actuated slot-closer formed in sections and adapted to operate at an angle upon the said guide-posts, and means for operating the said slot-closer, substantially as described.

24. In an underground railway system, the combination with a car carrying means for operating a slot-closer, and having a trolley-wheel suitably connected thereto, of a conduit suitably arranged within or adjacent to the track-bed and provided with a longitudinal slot, an electrical conductor arranged in the

said conduit and adapted to be engaged by the said trolley-wheel, a series of guide-posts arranged at an angle within the said conduit, and a spring-actuated slot-closer formed in sections and adapted to be operated by the said operating means therefor at an angle, substantially as set forth.

25. In an underground railway system, the combination with a car carrying operating means for a slot-closer, and a trolley-wheel suitably connected thereto, of a conduit suitably arranged within or adjacent to the track-bed and provided with a longitudinal slot, an electrical conductor arranged in the said conduit and adapted to be engaged by the said trolley-wheel, a series of guide-posts arranged at an angle within the said conduit, a spring-actuated slot-closer formed in sections and adapted to be operated at an angle by the said operating means carried by the car, and a series of guide-pins arranged at an angle in the said conduit for the said slot-closer, substantially as described.

26. In an underground railway system, the combination with a car carrying operating means for a slot-closer, and a trolley-wheel suitably connected thereto, of a conduit formed of a casing and one of the rail-sections of the track, a removable cover for the said casing and so arranged as to form a longitudinal slot between the same and said rail-section, an electrical conductor arranged in the said conduit and adapted to be engaged by the said trolley-wheel, a series of guide-posts arranged at an angle within the said conduit, and a spring-actuated slot-closer formed in sections and adapted to be operated at an angle by the said operating means carried by the car, substantially as described.

27. In an underground railway system, the combination with a car carrying operating means for a slot-closer and a trolley-wheel suitably connected thereto, of a conduit formed of a casing and one of the rail-sections of the track, a removable cover for the said casing and so arranged as to form a longitudinal slot between the same and said rail-section, an electrical conductor arranged in the said conduit and adapted to be engaged by the said trolley-wheel, a series of guide-posts arranged at an angle within the said conduit, a spring-actuated slot-closer formed in sections and adapted to be operated at an angle by the said operating means carried by the car, and a series of guide-pins arranged at an angle within the said conduit for the said sections, substantially as described.

28. In an underground railway system, a conduit formed of a casing and one of the rails of a track, a removable cover provided upon its lower face with a recess adapted to receive a portion of the side of the said casing for securing the cover in position, and so arranged in respect to the said rail that an elongated longitudinal slot is formed to allow of the operation of a trolley-wheel and stem within the said casing, a series of guide-posts arranged

at an angle within the casing and having mounted thereon a compression-spring, and a series of guide-pins arranged at an angle within the said casing, substantially as described.

29. In an underground railway system, the combination with a conduit provided with a longitudinal slot, of a closer for the said slot consisting of a series of sections, each provided with means at each end for securing the same together and further provided with the recesses 42 to receive a spring-actuating means, recesses 45 to receive a guide means, and the cut-away portions 44, substantially as described.

30. In an underground railway system, the combination with a conduit provided with a longitudinal slot, of a closer for the said slot composed of a series of sections, one end of each of the said sections formed of a head 49, and pin 50 suitably connected thereto, and the opposite end of each of the said sections formed with a head 48 provided with a slot 52 to receive the said pin for securing the said sections together, substantially as described.

31. In a railway system, the combination with a conduit provided with a longitudinal slot and a spring-actuated slot-closer therefor, of an operating means carried by a car for the said slot-closer and consisting of a lever formed of two sections 9 and 10 suitably connected together and supported from the car-body, a pair of downwardly-extending arms formed integral with the said section 10, a depressing-wheel connected to each of the said arms and adapted to engage the said slot-closer, and means for operating said lever and adapted to cause the said wheels to operate the said slot-closer, substantially as described.

32. In a railway system, the combination with a conduit provided with a longitudinal slot and spring-actuated slot-closer therefor, of an operating means carried by a car for the said slot-closer and consisting of a lever formed of two sections 9 and 10 suitably connected together, a pair of bifurcated links suitably suspended from the bottom of a car and adapted to support said section 10, a pair of downwardly-extending arms formed integral with the said section 10, a depressing-wheel connected to each of the said arms and adapted to engage the said slot-closer, and means for operating said lever and adapted to cause the said wheels to operate the said slot-closer, substantially as described.

33. In a railway system, the combination with a conduit provided with an elongated slot and a spring-actuated slot-closer therefor operating upon a series of guide posts and pins, of an operating means carried by a car for the said slot-closer and consisting of a lever formed of two sections 9 and 10 suitably connected together, a pair of links suitably suspended from the car and adapted to sup-

port said section 10, a pair of downwardly-extending arms connected to the said section 10, a depressing-wheel secured to each of the said arms and adapted to engage the said slot-closer; a trolley suitably suspended from the car, and means for operating the said lever for causing the said wheels to suitably depress the said slot-closer to allow of the operation of the trolley within the said conduit, substantially as described.

34. In a railway system, the combination with a conduit provided with a longitudinal slot, of a slot-closer formed of a series of sections operating at an angle and having the upper face thereof on a horizontal plane, and depressing-wheels for operating the said slot-closer having their tread on a horizontal plane when in an operative position, substantially as described.

35. In a railway system, a conduit formed with a longitudinal wedge-shaped slot, a spring-actuated slot-closer formed of a series of sections, operating at an angle and adapted to be normally seated within the said slot, each of the said sections having their upper face formed on a horizontal plane, a series of guide posts and pins arranged in the conduit for the said sections, depressing-wheels for operating the said slot-closer having their tread on a horizontal plane when in an operative position, in combination with means carried by a car and connected to the said wheels for operating the same, substantially as described.

36. In a railway system, a conduit formed with a longitudinal slot, a spring-actuated slot-closer adapted to normally close the said slot and having its upper face on the same plane as the top of the conduit, depressing-wheels for operating the said slot-closer having their tread formed on a horizontal plane when in an operative position, in combination with means carried by a car and connected to the said wheels for operating the same, substantially as described.

37. In a railway system, a conduit formed with a suitable slot, a spring-actuated slot-closer adapted to normally close the said slot and having its upper face on the same plane as the top of the conduit, said closer formed of a series of sections suitably connected together, a series of guide posts and pins arranged in the said conduit for the said closer, depressing-wheels for operating said slot-closer and arranged at an angle, in combination with means carried by a car and connected to the said wheels for operating the same, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN B. LARKIN.

Witnesses:

JOHN NOLAND,  
H. C. EVERT.