

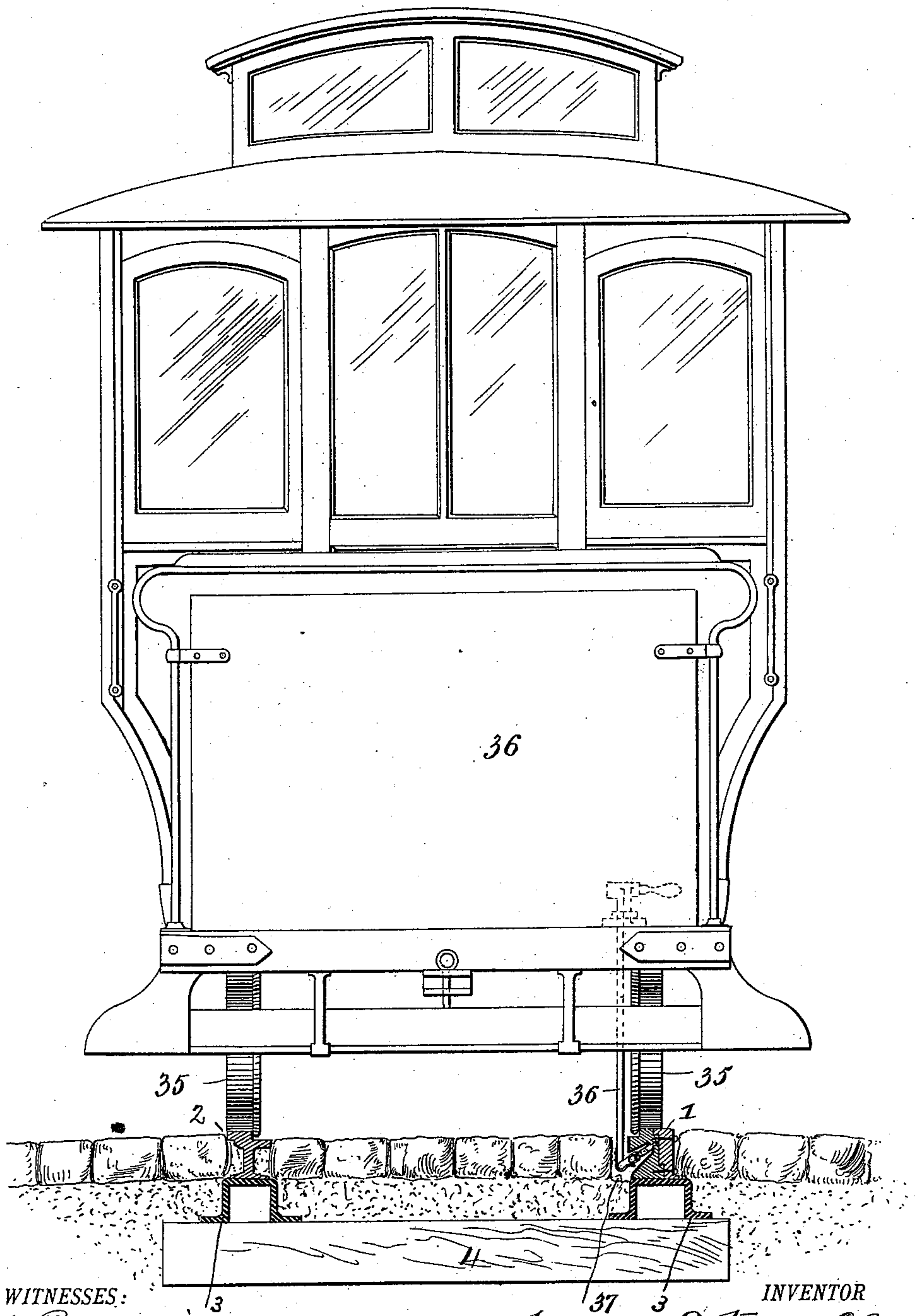
(No Model.)

2 Sheets—Sheet 1.

O. COHEN.  
CONDUIT ELECTRIC RAILWAY.

No. 534,495.

Patented Feb. 19, 1895.



WITNESSES:  
*C. W. Benjamin*  
*Wm. Jacobsen.*

*Fig. 1.*

INVENTOR  
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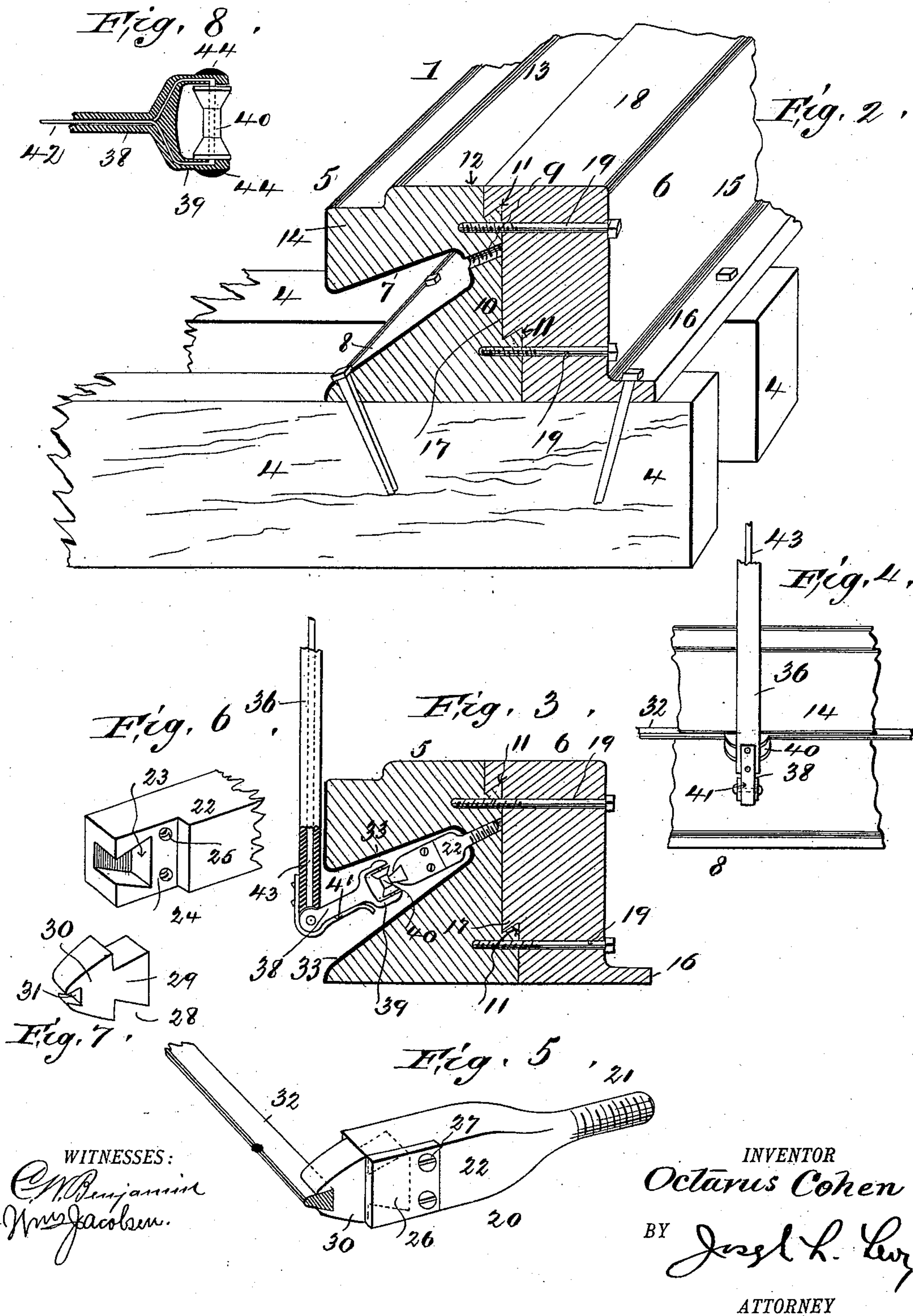
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# UNITED STATES PATENT OFFICE.

OCTAVUS COHEN, OF NEW YORK, N. Y., ASSIGNOR TO REBECCA O. COHEN,  
OF SAME PLACE.

## CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 534,495, dated February 19, 1895.

Application filed May 15, 1894. Serial No. 511,381. (No model.)

*To all whom it may concern:*

Be it known that I, OCTAVUS COHEN, a citizen of the United States, residing in the city, county, and State of New York, have made certain new and useful Improvements in Conduit Electric Railways, of which the following is a specification.

My invention relates to the so called conduit systems as applied to vehicles, such as railway cars, for the purpose of propelling them.

My invention consists in a conduit system in which the track rail is utilized for the purpose of supporting the trolley or circuit wire, and also in the combination therewith of a contact or trolley pole, carried by the car moving on the rail.

My invention further consists in the combinations and details of structure hereinafter described and further pointed out in the claims.

In the drawings forming part of this specification: Figure 1 is an end elevation of a car, road bed and rails, both rails being in section, one of which is constructed in accordance with my invention, diagrammatically representing the general relation of parts. Fig. 2 is an isometrical elevation, enlarged, of the preferred form of rail construction embodying my invention, partly in section, showing the same applied to the ordinary wood cross tie. Fig. 3 is a sectional elevation of the preferred form of rail, showing the groove or conduit, the trolley wire hangers or brackets in place, and a portion of a suitably constructed trolley pole. Fig. 4 is a side elevation of Fig. 3. Fig. 5 is an enlarged perspective view of one of the hangers and a portion of the trolley wire therein. Fig. 6 is a perspective view, enlarged, of one end of the hanger, showing its receiving socket, and Fig. 7 is a like view of the insulating plug for the hanger. Fig. 8 is an enlarged sectional elevation of the contact end of the trolley pole of suitable construction.

In all the views similar numerals of reference indicate like parts.

The prime object of my invention is to create a system of electrical propulsion, wherein the connection of the current bearing wire and the contact carried by the car and electrically connected with the motor on the car can be made at the rail itself, and so obviate the necessity

of using the costly and readily derangeable overhead system, or the likewise costly sub-surface conduit system, and thus provide a system wherein the contact or trolley pole will readily follow the line, curves and sinuosities of the track without the usual dangers from disconnection, breaking of the circuits from outside influences, &c., and wherein also the trolley pole will be practically concealed from view and readily controlled from the interior of the car.

To this end the main and essential feature of my invention lies in providing a rail with a well defined or positively formed and protected groove, preferably inclined to the base line of the rail, and opening out from the inside perpendicular face or web of the rail, in which the trolley or current wire is supported and concealed from view. For this purpose I prefer to construct my rail as follows, it being understood that only one of the rails is so provided with the groove:

At 1, Fig. 1, is shown the compound grooved rail, and at 2 the usual girder rail, supported upon longitudinal chairs 3, fixed to transverse or longitudinal ties 4.

As before stated, instead of using a unitary or one piece rail in which to form the groove for supporting the trolley or line wire, I construct it in two parts, as 5, 6, Fig. 2, the part 5 having a wedge shaped upwardly inclined groove 7 on its inner face, a flange 8 for securing it to a tie as 4, or other support, as the chair 3 (Fig. 1), a screw threaded hole 9 passing entirely through the outer face 10 and entering the groove, the outer face being provided with a series of graduated angular projections 11, which will hereinafter be termed interlocking points, an upper tread 12, an engaging flange 13, and the overhanging flange 14. The section 6 has a plain outer face 15, a flange 16 for securing it to a tie as aforesaid, and a series of graduated angular projections 17 on its inner face, and a tread 18. Thus with the divided or two part rail I am enabled the better to tap the hole 9 in the grooved rail section, and dispose it at the proper angle for supporting the hangers, both sections being tapped transversely to receive securing bolts 19, which, when turned home in the screw threaded portion of the tapped



holes in the groove section, bring the interlocking points together, and firmly unite the two parts. The rail thus formed is somewhat of greater breadth than the ordinary rail; and by disposing the groove and the surrounding material, substantially in the manner shown, interference with the line wire and short circuiting are practically avoided.

The means for supporting the line wire in the groove will now be described.

At 20, Fig. 5, is a hanger or bracket, preferably of cast iron in the form disclosed, having at one end a screw threaded spindle or extension 21 adapted to be inserted into the hole 9, as in Fig. 3, and a preferably squared body 22, in the front part of which is formed an angular socket 23, closed on one side and opening into a squared recess 24, provided with screw holes 25. The socket is to be covered and closed by a plate 26, through which the screws 27 pass into the holes 25, leaving only the narrow and forward portion of the socket opening out from the end of the bracket.

The socket and plate are provided for the purpose of supporting a plug or block 28 of non-conducting material, such as micanite or the like, the plug having an angular extension 29, which forms with the angular socket a mortise and tenon joint and an enlarged head 30, in the front portion of which is formed an angular recess 31 to receive the line wire 32, which is also angular and forms with said recess a like mortise and tenon joint.

In assembling the parts, the rail is first formed as shown in Fig. 2, either with or without the securing of the brackets in place, and after the rail has been laid the line wire can be run by first removing the plate 26, inserting the insulating block or plug 28 in the socket as shown, with or without the line wire in place therein, securing the plate over the socket, and then connecting the ends of the sections of line wire in any of the well known ways. In this way I provide for the support of the line wire in the groove, and insulate it from the rail, the entire inner face of the grooved section of the rail and the walls of the groove itself being provided with an insulating coating as at 33.

The circuit can be completed say by a metallic return, or in any other suitable or desired manner, and should one of the grooved rails become displaced, the line wire broken or disconnected at any one point, or by any other usual cause the circuit becomes disturbed, that section can be bridged by the usual method of connecting the ends of the good sections, and running the cars over the bad section by horse, momentum, or hand, until repairs can be made.

I will now describe a suitable device for collecting the current from the line wire and conducting it to the car and to the motor thereon; and as the essential and important portion of my present invention lies in the

grooved rail, as before set forth, any other suitable form of collector or trolley pole, so called, can be advantageously used.

At 34, Fig. 1, is a car of the usual construction having wheels 35 engaging the rails, the flange 13 of the two part rail engaging the flange of the wheel. From the car, preferably intermediate of the forward and rear wheels, depends a trolley rod 36, the lower portion of which travels in a furrow or space 37 (Fig. 1) formed adjacent the grooved rail, supporting at its lower end a hinged arm 38, carrying at its outer bifurcated end 39 a contact roller 40, mounted on a suitable spindle, a spring 41 being used to keep the arm 38 at the desired angle in the slot and preserve the alignment of the contact roller with the line wire. The hinged arm may be of non-conducting material, and an insulated conducting wire as 42 leading from the contact roller up to the trolley rod to the motor can be used; or the entire hinged arm can be of conducting material and properly insulated from the trolley rod and connected through an insulated wire 43 with the motor.

The forward portion 39 of the arm 38 is preferably provided with rubber or other elastic cushions or buffing pads 44, so as to prevent the arm from abrading or destroying the insulation 33 on the face of the groove.

The spring and jointed connection of the arm 38 with the trolley rod enables the arm to straighten out in case the car leaves the track, or for other reason, and thus free itself from the groove without serious damage.

Means can also be provided, preferably for rotating the trolley pole and its arm and roller, such as a handle, so as to swing them in or out of the groove at the proper time, such as at the end of the line where no loop for switching is employed; also for draining the furrow 37; and for keeping the furrow and groove in the rail clear of ice, snow, dirt and other obstacles.

Where I have used the term "continuous with said rail" in the claims, I desire to be understood as meaning practically continuous, as a switch, turn out or some other like device can intervene where the groove would be useless.

Many changes and modifications can be made in the design of the grooved rail, and the means for supporting the line wire therein, and also in the details of construction of the connecting or trolley devices, without departing from the spirit of my invention.

I claim—

1. In a system of electrical propulsion, the combination with a rail having an upwardly inclined groove therein, a series of inclined brackets secured within the groove, and a line wire secured to said brackets, said wire being entirely within the groove, substantially as described.

2. In a system of electrical propulsion, the combination with a suitable wheeled vehicle having a motor, a track having rails for



movably supporting said car, one of said rails having an upwardly inclined groove therein continuous with the rail, a line wire supported within said groove by disconnected  
5 and inclined brackets, and a trolley rod having an upwardly inclined contact portion depending from said car and electrically connecting said wire with the motor on the car, substantially as described.

10 3. In a system of electrical propulsion, the combination with a suitable wheeled vehicle having a motor, a track or road bed having rails for movably supporting said vehicle, one of said rails having an upwardly inclined  
15 groove therein continuous with said rail, a furrow in said road bed adjacent the grooved rail and continuous with said groove, a line wire supported in said groove, and a trolley pole carried by said vehicle in electrical connection with the said wire and motor, sub-  
20 stantially as described.

4. The combination of the rail section having an upwardly-inclined groove extending from one of its vertical faces, of a further  
25 section, both sections having interlocking joints, an inclined bracket in said groove for supporting a wire, and means for securing both sections together, substantially as described.

30 5. In a system of electrical propulsion, a rail section having an exteriorly opening and upwardly extending groove below its tread and wheel engaging flange, an upwardly inclined bracket in said groove for supporting a line  
35 wire, said line wire, a further rail section, both sections having irregular and vertically disposed interlocking faces, and means for securing both sections together to form a single rail, substantially as described.

40 6. In a system of electrical propulsion, the combination with the rail section 5 having the bearing tread and flange, the angular and inclined groove 7, a line wire supported in the groove, the interlocking points 11, the section  
45 6 having the tread 18 and interlocking points 17, and the bolts 19 for uniting and interlocking both sections together, substantially as described.

50 7. In a system of electrical propulsion, the combination with the rail section 5 having the inclined and angular groove 7 in its inner face, a hole 9 extending from said groove to the opposite face, a bracket secured in said

hole and in the groove, a line wire supported by said bracket, and a second rail section se- 55  
cured face to face to the section 5, substantially as described.

8. The combination with the grooved rail, of a bracket in said groove, a socket in said bracket, an insulating plug or block secured 60  
in said socket, and a line wire supported by said block, substantially as described.

9. The combination with the grooved rail, of the bracket secured within said groove, a socket in said bracket, an insulating block in 65  
said socket, and a plate for detachably securing said block in the socket, substantially as described.

10. The combination with the grooved rail, of the bracket in said groove, a mortised 70  
socket in said bracket, an insulating block having a tenon for engaging said mortise, a plate for securing the block in the socket, and a line wire supported by said block, sub-  
stantially as described. 75

11. The combination with the grooved rail, of the bracket in the groove, the insulating block secured in said bracket, an angular recess in said block, and a line wire having a sectional contour conforming to said recess 80  
secured therein, substantially as described.

12. The combination with the rail having an inclined and upwardly extending groove opening in one of its vertical faces, inclined brackets in said groove accessible from the 85  
outside of the rail, a line wire supported by the brackets, a car, a trolley rod depending from said car, an inclined and upwardly extending arm hinged to said rod, a contact roller on the arm for engagement with the 90  
said wire, and a spring for maintaining the alignment of the arm and roller with said wire, substantially as described.

13. The combination with the grooved rail, and the line wire supported in said groove, 95  
of the suitably supported hinged arm 38 having the contact roller 40 thereon, and the buffing pads 44 on the end of said arm, substantially as described.

Signed at the city, county, and State of New 100  
York this 5th day of May, 1894.

OCTAVUS COHEN.

Witnesses:

H. B. DELAIGNE,

B. S. WISE.