

No. 887,691.

PATENTED MAY 12, 1908.

W. B. POTTER.  
ELECTRICALLY DRIVEN VEHICLE.

APPLICATION FILED JUNE 26, 1903.

2 SHEETS—SHEET 1.

Fig. 2.

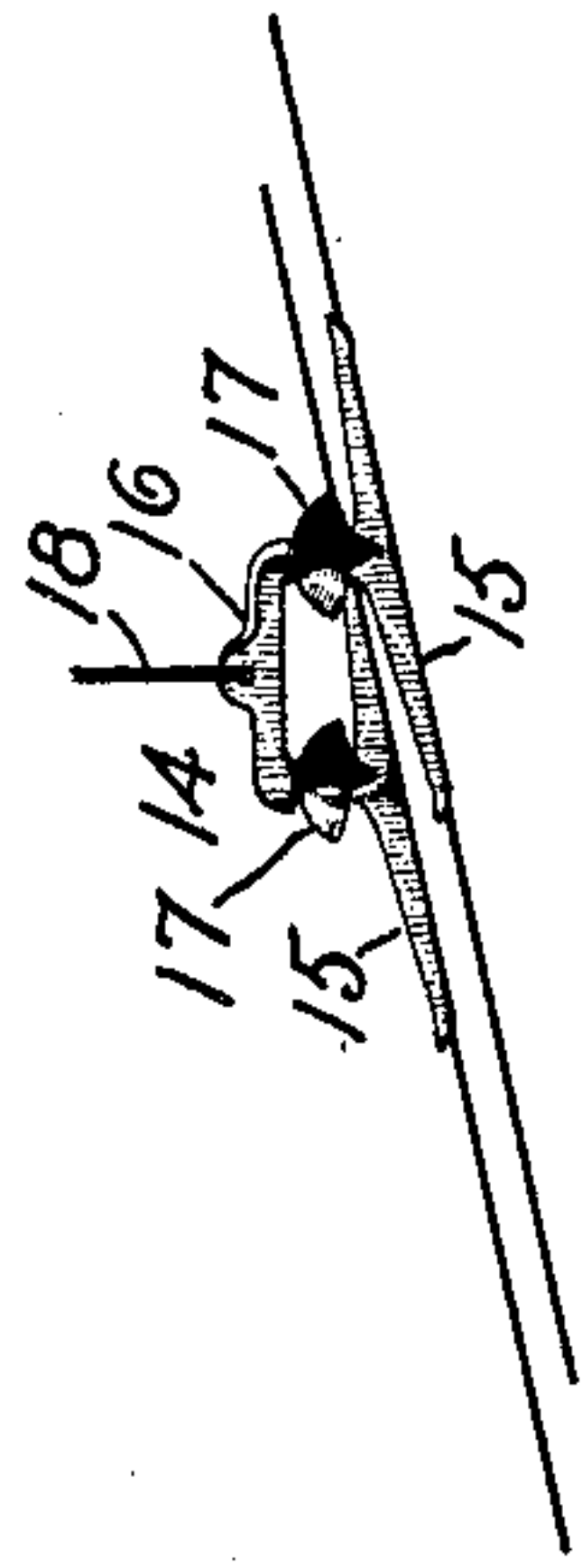


Fig. 3.

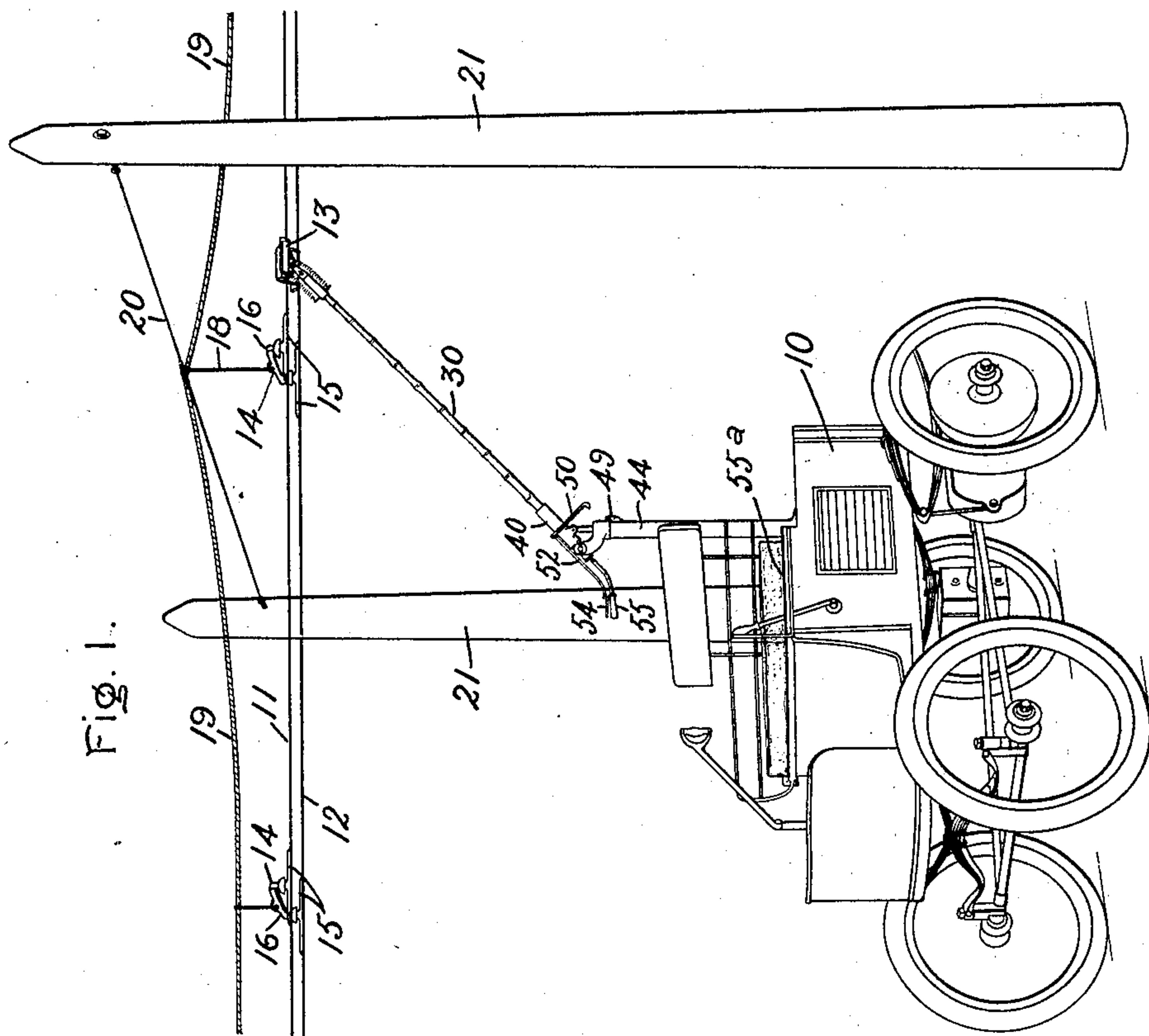
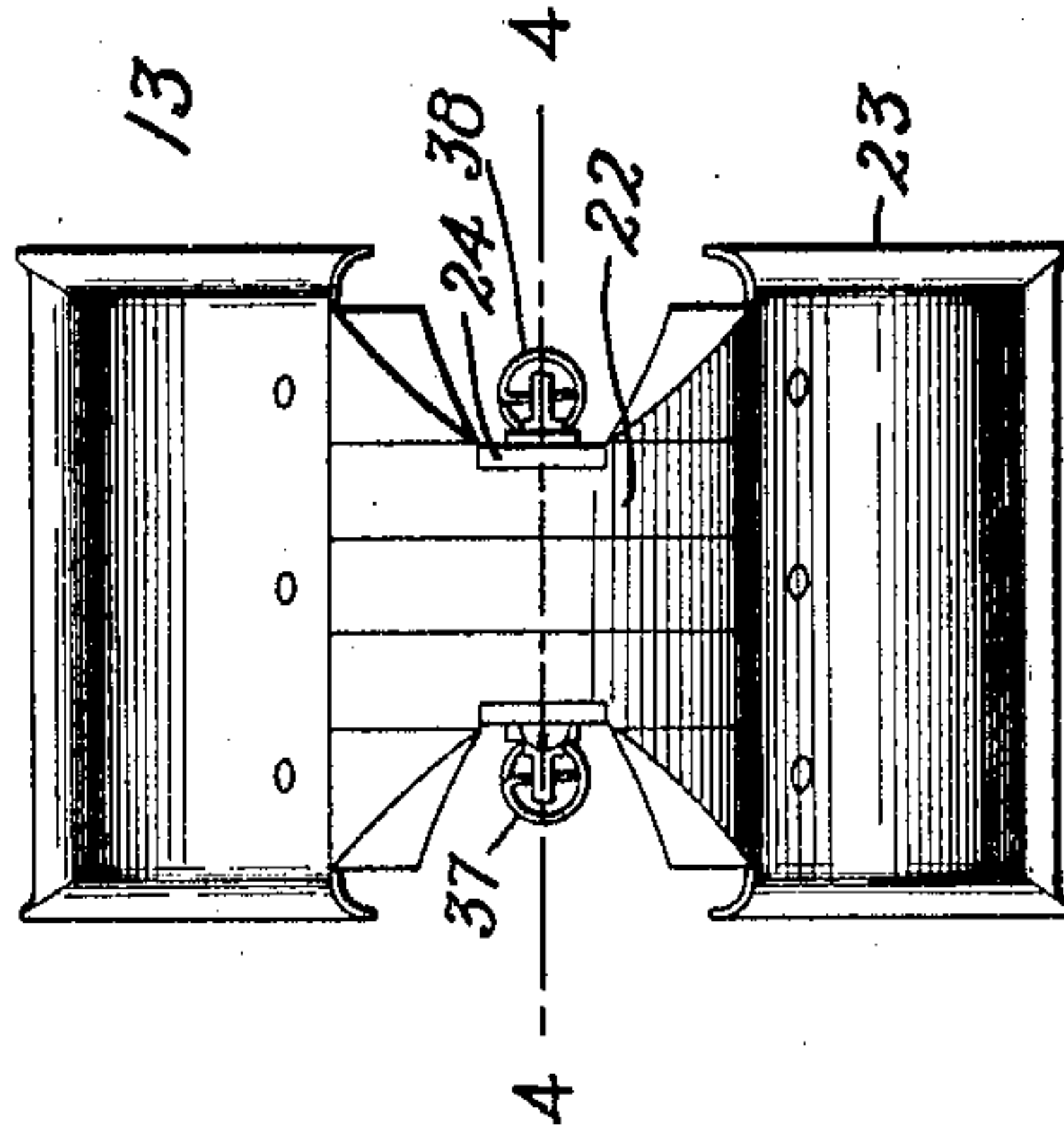


Fig. 1.

Witnesses:

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Inventor:

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by *Albert B. Davis*  
Att'y.

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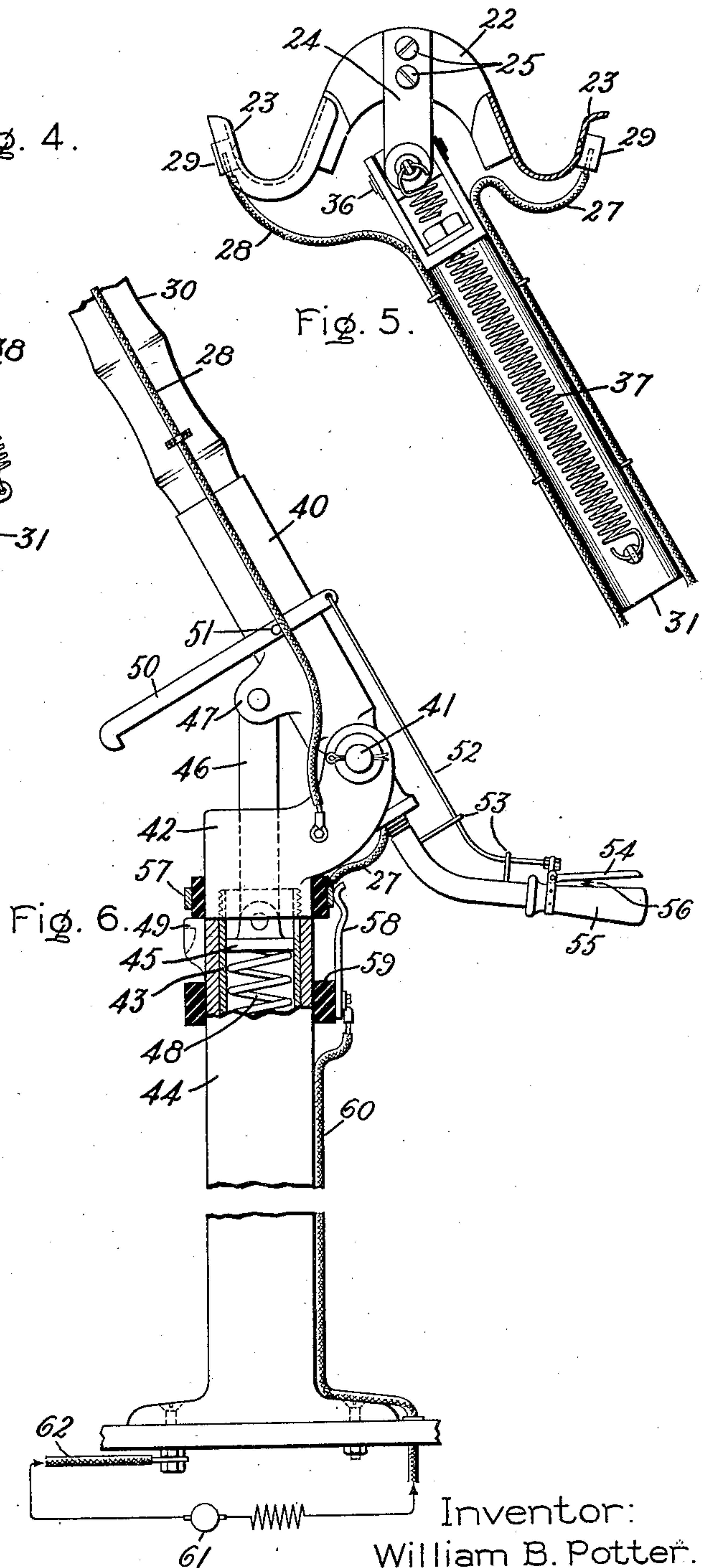
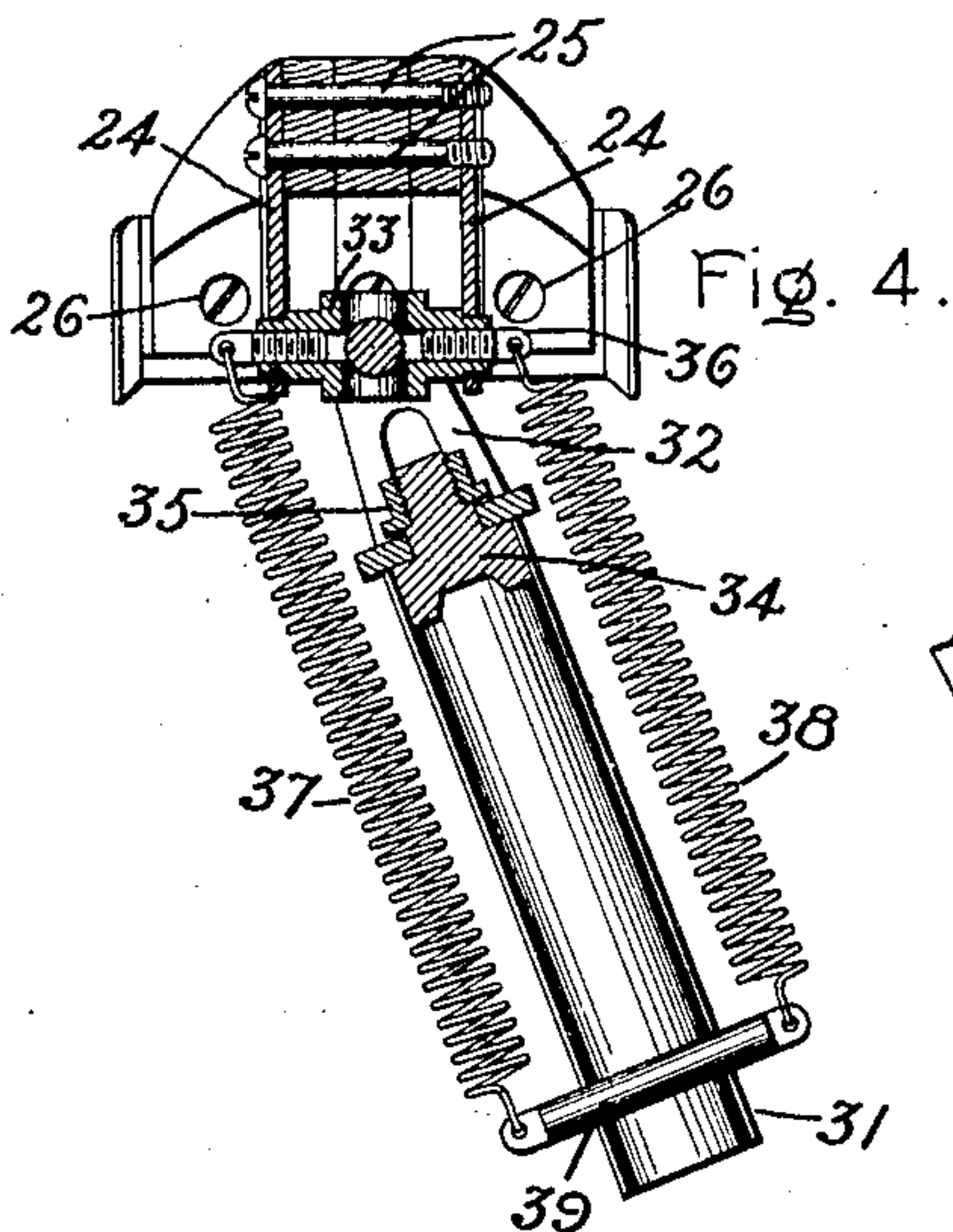
PATENTED MAY 12, 1908.

W. B. POTTER.

ELECTRICALLY DRIVEN VEHICLE.

APPLICATION FILED JUNE 25, 1903.

2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## ELECTRICALLY-DRIVEN VEHICLE.

No. 887,691.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed June 25, 1903. Serial No. 163,088.

*To all whom it may concern:*

Be it known that I, WILLIAM B. POTTER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electrically-Driven Vehicles, of which the following is a specification.

My invention relates generally to electrically-driven vehicles which are adapted to run over a highway without tracks and to receive their power from an overhead conductor, and more particularly to a novel form of trolley construction by which a practically continuous connection may be maintained between the overhead conductor and the driving motor under all the varying conditions incident to the operation of such vehicles.

One object of my invention is to provide a trolley which can be readily placed in contact with the overhead conductor, not only when the vehicle is directly beneath the conductor but also when it is laterally moved from such a position, and which may be placed and will remain in such contact position throughout a wide range of such lateral movement.

Another object of my invention is to provide the trolley pole with a handle which under normal running conditions extends into a position to be conveniently grasped by the operator and which may be moved by him to move the pole and trolley to any desired position.

Other objects and advantages of my invention will appear from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a general view illustrating a vehicle provided with a trolley constructed in accordance with my invention and showing the trolley in contact with the overhead conductor; Fig. 2 is a perspective view of a hanger for the overhead conductor; Fig. 3 is a plan view of the trolley; Fig. 4 is a central section of said trolley and its supporting pole, taken on the line 4 4 of Fig. 3; Fig. 5 is an end view of the trolley and its pole with one of the contact-shoes shown in section; and Fig. 6 is a side elevation of the trolley-pole base or support with parts broken away and in section to illustrate the spring mechanism by which the trolley is forced upward into engaging position.

In the drawing, in which like characters refer to like parts throughout the several views, 10 designates an electrically-driven vehicle whose motor is adapted to receive current from two overhead conductors 11 and 12 through the contact shoes of a trolley 13 and suitable connecting conductors. The overhead conductors 11 and 12 are supported and spaced by hangers 14, each of which comprises the usual ears 15 15 to which the conductors 11 and 12 are secured, and a yoke 16 connected to said ears through suitable insulators 17 17. Each of the yokes 16 is supported at its center by a rod 18 which is secured at its upper end to a cable 19 which extends lengthwise of the conductors 11 and 12 and is supported at regular intervals by transverse suspension wires 20 extending between suitable supporting poles 21 21.

The trolley head 13 consists essentially of a central insulating block 22 which is adapted to extend upward between the conductors 11 12 when the trolley is in position, and outwardly extending contact shoes 23 23 secured to its outer edges and adapted to engage the under side of said conductors. The block 22 is built up of a number of strips of wood which are rounded off and cut away so as to form a structure having a cylindrical upper surface and a concave under surface, as is clearly illustrated in Figs. 3, 4 and 5. Vertical metal strips 24 24 are fixed at their upper ends to the opposite ends of the central portion of the block 22 by bolts 25 25 which pass therethrough and serve to clamp together the wooden strips which make up that portion of the block. The contact shoes 23 23, which are substantially U-shaped, are secured to the outer opposite edges of the block 22 by suitable screws 26 and have their ends and outer edges turned over so as to provide smooth rounded corners. The outer upturned portions of the U-shaped contact shoes constitute retaining flanges which are adapted to engage the overhead conductors and prevent their passing laterally out of contact with said shoes. Insulated conducting wires 27 28, whose bared ends are soldered to the terminal blocks 29 29 riveted to the outer surfaces of the contact shoes 23 23, extend down opposite sides of the trolley pole 30 and are adapted to convey current from said shoes to the vehicle motor.

The trolley head 13 is connected to its sup-



porting pole by a universal joint which consists essentially of a ferrule 31 which is adapted to pass over the upper end of the trolley pole 30, a yoke 32 swiveled to the upper end of the ferrule 31, and a cross 33 pivoted transversely between the arms of the yoke 32 and longitudinally to the vertical strips 24 of the block 22. The swiveled connection between the yoke 32 and the ferrule 31 is provided by driving a plug 34 into the end of the ferrule 31 and cutting down its end so as to form a pivot for the yoke 32, which is suitably apertured for the purpose, and screwing a nut 35 thereon so as to keep the yoke in place.

Coiled springs 37 38, whose upper ends are secured to threaded pins screwed into the opposite longitudinal ends of the cross 33, extend downward in a direction parallel to the ferrule 31 and are secured at their lower ends to the opposite ends of a pin 39 which passes through said ferrule and the upper end of the pole 30. The springs 37 and 38 are of unequal length and normally hold the trolley head 13 at an oblique angle to the trolley pole, as clearly illustrated in Fig. 4, and at the same time yieldingly hold the longitudinal axis of said trolley in the plane of the trolley pole and the pin 39.

The lower end of the trolley pole, which is preferably composed of bamboo or other light material, is firmly seated in a socket 40 which is secured by a pivot 41 near its lower end to the bifurcated bracket head 42 of the trolley base. Screwed into the underside of the head 42 is a pipe 43 which serves as a supporting spindle and passes into the interior of the post 44. A plunger 45 is located within the pipe 43 and is connected by a link 46 to a lug 47 on the under side of the socket 40, and a coiled spring 48 located within the pipe 43 normally presses upward against the under side of the plunger 45 and thereby forces the trolley pole 30 upward and thus maintains the contact shoes 23 in firm engagement with the under side of the conductors 11 12. The upper end of the post 44 is provided with a recessed lug 49 with which a latch 50 pivoted to the socket 40 is adapted to engage when the trolley pole is drawn downward into a substantially horizontal position. The latch 50 which is pivoted at an intermediate point 51 is connected at its upper end to a rod 52 which extends through guides 53 53 to a bell-crank lever 54, which is pivoted to a handle 55 and is yieldingly pressed outward by a spring 56 so as normally to maintain the latch 50 in engaging position. The bell-crank lever 54, as illustrated, is in proximity to the handle 55 so that it may be grasped at the same time said handle is grasped and manipulated so as to readily release the latch 50. When the end of the latch 50 passes into the recess in the lug 49 by engagement with the lateral

walls of said recess it also prevents any rotary movement of the trolley pole about its base.

The post 44 which supports the trolley pole is located immediately in the rear of the vehicle seat 55<sup>a</sup>, so that when the parts are in their usual operative position the handle 55 will extend forward over said seat into a position to be conveniently grasped by the operator when he desires to place or remove the trolley from the overhead conductors or lock it in disengaged position by means of the latch 50.

The conducting wires 27—28, which lead from the contact shoes 23 23, extend down the trolley pole on opposite sides and are secured thereto at suitable intervals, as illustrated. One of these, the wire 28, is electrically connected to the head 42 of the trolley base, while the other, 27, is similarly connected to a contact ring 57 which is secured to the lower end of said head and suitably insulated therefrom. This ring is in constant engagement with a brush 58 which is firmly secured at its lower end through suitable insulation 59 to the post 44, and a wire 60 leads from the lower end of the brush 58 down along the post to the driving motor 61 of the vehicle. The other leg of the circuit, which includes the wire 28 and the head 42, is completed through the post 44 and the wire 62 which is electrically connected to the lower end of said post.

The angular relation of the trolley head 13 and the pole 30, produced by the springs 37 38, is such that in the operation of placing the trolley in contact with its conductors, the shoes 23 23 are brought to a substantially horizontal position just as they are about to engage said conductors. Because of this relation and the tendency of the springs to hold the trolley head 13 in one position, the long dimensions of the cylindrical insulating block 22 will always lie in a direction substantially parallel with the overhead conductors as long as the vehicle is running in the direction of such wires, or nearly so, and when placing the trolley will readily pass upward with a wedge-like action between the conductors so as to bring the shoes into proper contact. Even though the horizontal angle between the block 22 and the conductors be considerable, still by reason of its rounded ends (clearly shown in Fig. 4) and its cylindrical upper surface it will readily twist around against the pull of the springs 37 38 and bring the shoes into the proper contact relation. Also, by reason of the arrangement of the parts, when the trolley is once in place, with its shoes properly engaging the under side of the conductors, the vehicle is free to move in a lateral direction for a considerable distance without bringing any substantial pull upon the trolley to displace it, as is clearly illustrated in Fig. 5.



In order to enable vehicles which are using the same overhead conductors to meet and pass, it is necessary that one of the trolleys be drawn down out of contact with the overhead conductors and held in such position while the other passes. In the operation of my device, this is done by grasping the handle 55 and drawing it upward. When the trolley is once disengaged, it may be held in that position either manually or mechanically by means of the latch 50.

It is clear that my invention is capable of varied application and may be embodied in different forms so that I do not wish to be limited to the specific construction herein disclosed, but aim to cover by the terms of the appended claims all modifications and alterations which may fall within its spirit and scope.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. The combination with a trolley pole, of a universal-joint cross swiveled thereto, a contact shoe longitudinally pivoted on said cross, and means for yieldingly holding said shoe at an oblique angle to said pole and in a definite swiveled relation thereto.

2. The combination with a trolley pole, of a universal-joint cross swiveled to one end thereof, a contact shoe longitudinally pivoted to said cross, and springs connected to longitudinal ends of said cross and to opposite sides of said pole.

3. The combination of a vehicle, an overhead conductor, a pole secured at its lower end to said vehicle, a member swiveled to the upper end of said pole, a universal joint cross transversely pivoted to said member, a contact shoe pivoted to said cross, and means for yieldingly holding said shoe at an oblique angle with said pole and in a definite plane passing through said pole.

4. The combination with a trolley pole, of a head having a universal-joint connection therewith and comprising a central insulating section and contact shoes at the sides thereof, and means for yieldingly maintaining the head in definite swiveled position with relation to said pole.

5. The combination with a trolley pole, of a head having a universal-joint connection therewith and comprising a central wedge-shaped section of insulation and contact shoes secured to opposite sides thereof, and means for yieldingly maintaining the angularity and the swiveled position of the head with relation to said pole.

6. The combination with a trolley pole, of a head having a universal-joint connection therewith and comprising a central wedge-shaped section of insulation and longitudinally grooved shoes secured to the sides thereof, and springs connected to the front and rear ends of said head and to opposite sides of said pole.

7. The combination of a vehicle, two overhead conductors, a pole secured at its lower end to said vehicle, a yoke swiveled to the upper end of said pole, a head transversely pivoted to said yoke, a central wedge-like block of insulation longitudinally pivoted to said head, U-shaped contact shoes secured to the opposite edges of said block, springs for holding said head in a definite position, and conducting wires electrically connected to said shoes and extending down said pole and adapted to connect with the vehicle motor.

8. The combination of a vehicle, two overhead conductors, a supporting post secured to said vehicle, a pivoted bracket head on said post, a pole secured at its lower end to said head, a contact device at the upper end of said pole comprising a pair of contact members, a contact strip secured to and insulated from said head, a flexible conductor electrically connecting one contact shoe with said head, a second flexible conductor electrically connecting the other contact shoe and said contact strip, a contact brush secured to and insulated from said post and adapted to engage said contact strip, and conducting wires connecting with said post and brush and adapted to lead to the vehicle motor.

9. The combination of a vehicle, an overhead conductor, a pole secured at its lower end to said vehicle by a vertical pivot, a contact device secured to the upper end of said pole, a handle rigidly secured to said pole at a point convenient to the operator and adapted to be moved by him in moving the pole and contact device, latch mechanism by which said parts may be locked to prevent the rotation of said pole about said vertical pivot, and means mounted on said handle for operating said latch mechanism.

10. The combination of a vehicle, an overhead conductor, a pole secured at its lower end to said vehicle, a contact device at the upper end of said pole adapted to engage said overhead conductor, spring mechanism tending to move said pole upward to bring said contact device into engagement with said conductor, a handle secured to said pole at a point convenient to the operator and adapted to be moved to counteract the spring mechanism and disengage said contact device from said conductor, latch mechanism by which said parts may be locked to retain said contact device in disengaged position, and means mounted on the handle for operating said latch mechanism.

11. The combination of a vehicle, an overhead conductor, a pole secured at its lower end to said vehicle by a vertical pivot, a contact device at the upper end of said pole adapted to engage said overhead conductor, spring mechanism tending to move said pole upward to bring said contact device into engagement with said conductor, a handle se-



cured to said pole at a point convenient to the operator and adapted to be moved to counteract the spring mechanism and disengage said contact device from said conductor and  
5 to rotate the pole about said vertical pivot, latch mechanism by which said parts may be locked to retain said contact device in disengaged position and prevent the rotation of said pole about said vertical pivot, and means

mounted on the handle for operating said 10 latch mechanism.

In witness whereof, I have hereunto set my hand this 24th day of June, 1903.

WILLIAM B. POTTER.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.