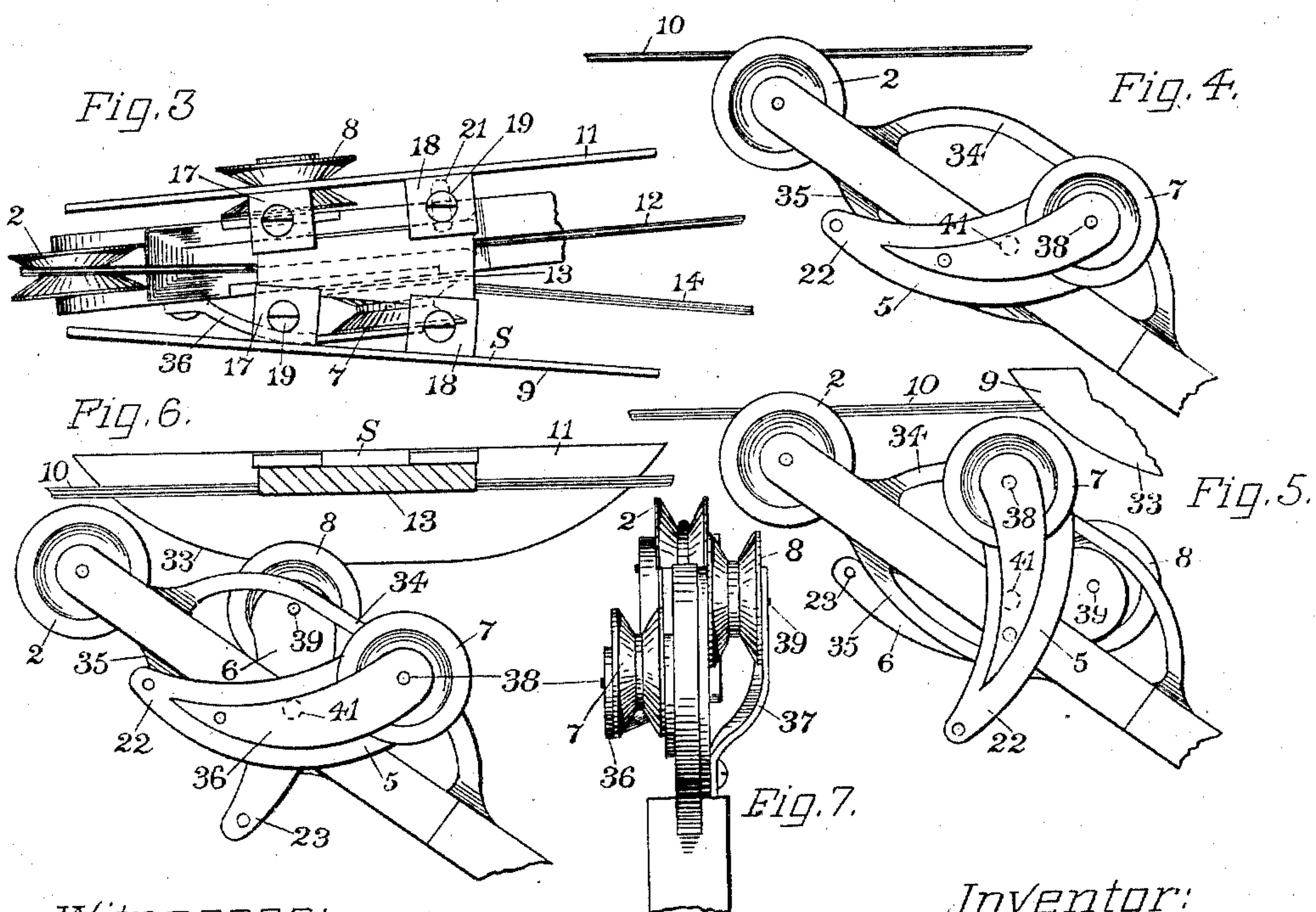
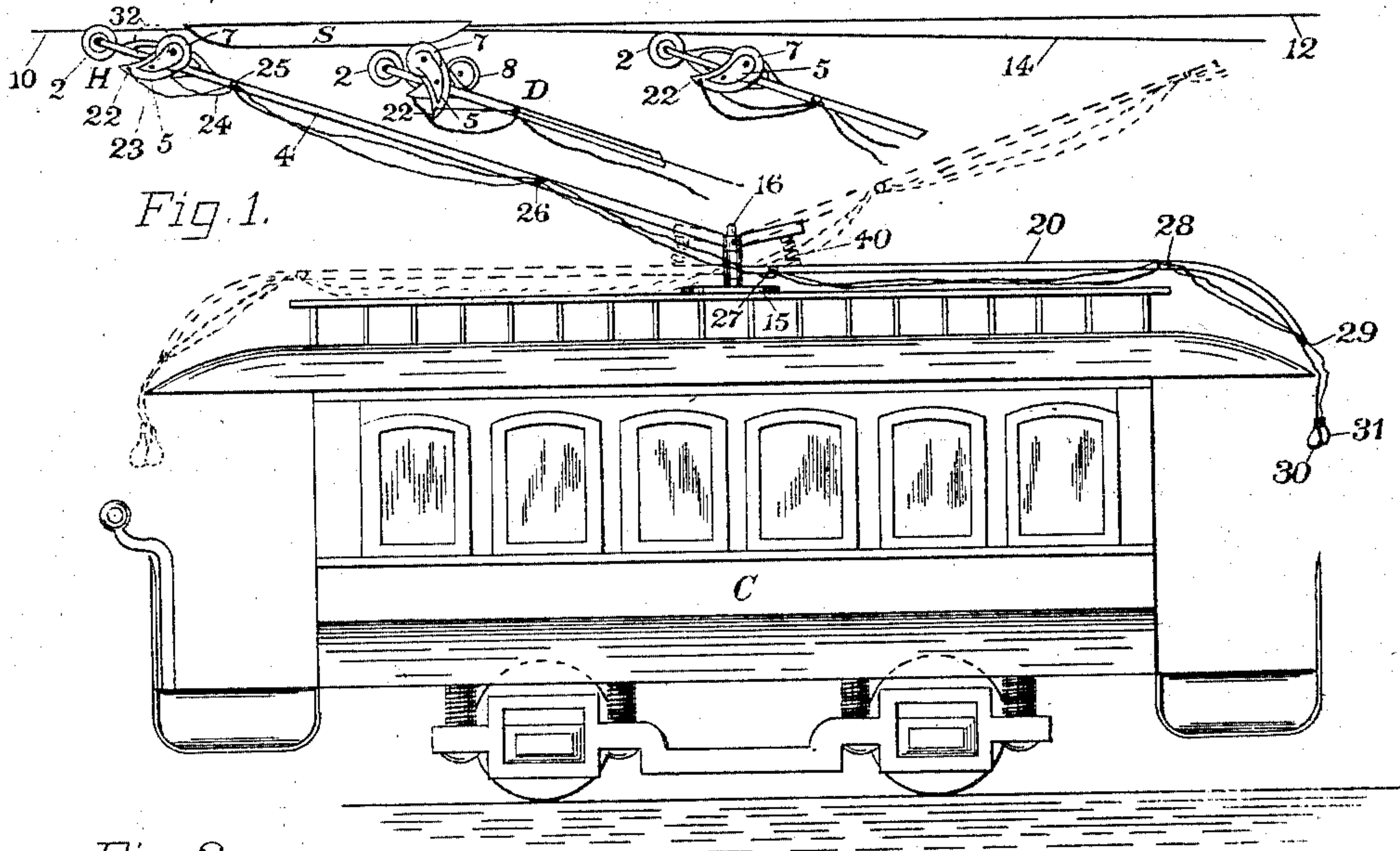


(No Model.)

J. H. ALLISON.  
ELECTRIC RAILWAY TROLLEY SWITCH.

No. 503,570.

Patented Aug. 22, 1893.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC-RAILWAY TROLLEY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 503,570, dated August 22, 1893.

Application filed March 3, 1893. Serial No. 464,536. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. ALLISON, a citizen of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Trolley-Switches, of which the following is a specification.

This invention relates to trolley switches for electric railways, the object being to provide a switch mechanism whereby the trolley may be switched from the main line to either one of two branch lines, or vice versa, as may be required.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of a car furnished with my improved trolley mechanism. Fig. 2 is a plan view of the trolley apparatus shown on the car in Fig. 1. Fig. 3 is an enlarged plan view of the switch, and showing the head of the trolley in position thereunder, for illustrating the preferred construction and mode of operation of the switch mechanism. Fig. 4 is an enlarged side view of the head of the trolley, corresponding to the position thereof at the left hand in Fig. 1. Fig. 5 is a view similar to Fig. 4, but showing one of the switch-levers set in position for action. Fig. 6 is a view similar to Figs. 4 and 5, but showing the other switch-lever in action. Fig. 7 is a view of the trolley-head as seen from the right hand in Fig. 6.

Similar characters designate like parts in all the views.

My improved trolley-mechanism is designed to be carried on the top of any suitable car, as C, Fig. 1, being reversible in the ordinary manner, and carrying at its upper end the usual roller, 2, for running against the under side of the line-wire 10. The trolley-arm 4 is pivotally supported at its lower end on the stem 16 (Fig. 1) of the base 15, which is set upon and fixed to the top of the car in any well-known manner. Said stem carries a guide-arm, 20, whose purpose is to support the lines or cords by means of which the motor-man may operate the switch-lever of the trolley-head. This head is designated in a general way by H, and it is furnished on either side thereof, adjacent to the contact-wheel 2,

with a pair of switch-levers, 5 and 6, one on either side thereof, and each, in practice, furnished with a roller, as 7 and 8, respectively, for engaging under the switch-guides 9 and 11, respectively, of the trolley-line switch.

At the junction of the main line 10 with the two branches 12 and 14, respectively, I place a switch connecting said lines, which switch consists of some suitable central part, as, for instance, the switch-plate 13, and of the switch-guides 9 and 11, one on either side of the switch, as will be understood by comparison of Figs. 1, 3 and 6. The line-wires 10, 12 and 14 may be attached to, or fixed in, a switch-plate, 13, in any well-known or convenient manner. The switch-guides, 9 and 11, are shown provided with suitable lugs, or ears, as 17 and 18, respectively, whereby these guides may be supported on the central plate 13 of the switch. In practice, said parts may be connected together by means of suitable bolts, as 19, Fig. 3, and the ears 18 may be slotted in the direction crosswise of the switch-guides, as indicated, for instance, by dotted lines at 21, Fig. 3, for permitting of the adjustment of said switch-guides to correspond with the required angle of the trolley-lines 12 and 14.

For actuating the switch-levers 5 and 6, each of these has connected to its lower end, at the points 22 and 23, respectively, two leading or operating lines or cords, 23 and 24, which, as indicated in Figs. 1 and 2, are carried alongside of the trolley-arm 4 by suitable supports (as, for instance, the cord guides 25 and 26 on the trolley-arm) and extend from the trolley-arm along the guide-arm 20, (being here supported by other cord guides, as 27, 28 and 29,) respectively, terminating in suitable handles, as 30 and 31, respectively.

In Fig. 1 the trolley is shown in working position by solid lines at the left hand, and its reversed position is shown by dotted lines at the right hand of its supporting stud 15. Similarly, when the trolley is at the left hand as shown by the solid lines, the guide-arm is at the right hand and supports the aforesaid handles 30 and 31 in convenient position for the motor-man to grasp them. When the trolley is thrown toward the right hand, as shown by the dotted lines in Fig. 1, the guide-



arm is shifted to the opposite end of the car as indicated by dotted lines at the left hand in Fig. 1, said handles being in position for the motor-man when he is at the left end of the car.

When the car is running under the line 10 toward the switch designated in a general way by S, Fig. 1, and it is required to switch the trolley from the line 10 to the line 14, (see Fig. 3,) the motor-man, seizing the handle 30, draws on the cord 23 to throw the switch-lever 5 from its idle position shown in Fig. 4 to its working position shown by dotted lines at 32, Fig. 1, and in Fig. 5. When thus set, the roll 7 of the switch-lever runs against and under the curved end 33 of the switch-guide 9, as will be understood from Figs. 1 and 5, thereby throwing down the trolley-head to carry the roll 2 below the line, as shown, for instance, in Fig. 3, and as shown in the middle position D, Fig. 1. As the car advances (toward the right hand in Fig. 1), the switch-lever runs off from the switch-guide 9, and in doing so guides the roll 2 against the wire 14. To switch the trolley from the wire 10 to the branch-wire 12, the opposite switch-lever 6 of the trolley-head is shifted to the position shown by dotted lines at 32, Fig. 1, and shown in Fig. 6. When thus set, the roll 8 of said switch-lever runs under the opposite switch-guide 11, as shown in Figs. 3 and 6, thereby lowering the trolley-roll 2 from the line 10, and afterward delivering it against the under side of the line 12 as the switch-roll runs from under the right-hand end of said switch-guide 11. In Fig. 3 the trolley-head is shown underneath the switch, in a position corresponding to that in Fig. 6 and during the transfer of the trolley from the line 10 to the line 12. For guarding the trolley-head against entanglement with cross wires and other obstructions, said head is shown provided on the upper side thereof with the guard-bar 34 standing between the switch-levers and extending upwardly from the trolley-arm sufficiently far to prevent any falling cross wires from getting into locking engagement front of the switch-levers. On the under side of the trolley-arm, this is shown furnished with a lower guard, 35, for similarly protecting the lower ends of said switch-levers. For protecting the switch-lever rolls from entanglement with any wires as aforesaid, the switch-levers are shown provided with guard-plates, 36 and 37, respectively, extending from the roll-bearings, or pivots, 38 and 39, outside of the trolley-arm, as will be understood by comparison of the several figures of drawings.

In using my improved trolley-switch mechanism, the motor-man, in approaching a turnout, seizes the proper one of the handles 30 and 31, and thereby, as hereinbefore described, throws into position for action the switch-lever for switching the trolley either to the right or to the left, as may be required, and holds on to the handle to maintain the switch-lever in the required position (as, for

instance, in Figs. 5, 6 and 7) until the trolley has passed the switch; when by releasing the handle, the switch-lever, by reason of the distribution of metal therein, resumes its normal idle position. Similarly, when about to run from either one of the two branch wires onto the single line, the motor-man should, before reaching the switch, throw into action that one of the switch-levers which corresponds to the line the car is running under, so that on coming to the switch the switch-lever will engage the proper switch-guide for guiding the trolley from the branch line to the single or main line. This mode of operation, however, is not essentially different from that described for running from the single line onto either one of the branch lines, and will, it is thought, be fully understood without further description.

If for any reason it may be preferred, a spring may be connected, in a well-known manner, for normally holding the switch-levers in idle position; which position is shown, for instance, in Fig. 4.

It will, of course, be understood that the two switch-rollers are employed in the switch-levers for the purpose of reducing friction, and not because the same are necessary to the operation of the switch-mechanism; plain levers suitable for engaging the switch-guides would, except for the undue friction, answer every requirement of the operation. It will be observed that one of the advantages of my present invention is that it makes a "continuous wire," since the entire switch is within the electric circuit, a connection being made through the switch-guide and switch-lever before the trolley-roller 2 is lowered from the line-wire. For elevating the trolley-arm to properly engage the under side of the line-wire, said arm may be provided with a spring, as 40, Fig. 1, operating in the usual well-known manner.

The switch-levers 5 and 6 are shown pivotally supported at the point 41, the pivot being shown by dotted lines in Figs. 4, 5 and 6, being covered by the guard-plates 36 and 37. The switch-levers may, however, be pivoted to the trolley-arm in any manner which on the shifting thereof will throw the working end of the lever into position for properly engaging the switch-guide; and in some cases the switching-rollers, or rollers 7 and 8, may be shiftably supported by means of any well-known kind of roll-carrier adapted for shifting the roll to and from the two positions shown, respectively, in Figs. 5 and 6, the particular construction and character of the shiftable switch-roll carrier not being essential to the general features of my present invention.

Having thus described my invention, I claim—

1. In a trolley switch-mechanism, the combination with the single-line wire and the double-line wires making a junction therewith, and with a switch-guide located alongside of said line wires at the junction thereof,



of the trolley-arm adapted to run on the line wires, and a switch-arm movably supported on the trolley-arm and shiftable from and into position for engaging the switch-guide to carry the trolley-arm from the single-line wire to one of the double-line wires, substantially as described.

2. In a trolley switch-mechanism, the combination with the single-line wire and the double-line wires making a junction therewith, and with a switch-guide located alongside of said line-wires at the junction thereof, of the trolley-arm adapted to run on the line-wires, one switch-arm movably supported on the trolley-arm and shiftable from and into position for engaging the switch-guide to carry the trolley-arm from the single-line wire to one of the double-line wires when the trolley is moving in a direction from said single-line wire toward the double-line wire, and a second switch-arm movably supported on the trolley-arm opposite to said first switch-arm and shiftable from and into position for engaging the switch-guide to carry the trolley-arm from the double-line wire to the single-line wire when the trolley-arm is moving in that direction, substantially as described.

3. In a trolley switch-mechanism, the combination with the single-line wire and the two double-line wires making a junction therewith, and with two switch-guides located one on either side of said line-wires at the junction thereof, of the trolley-arm adapted to run on the line-wires, and two switch-arms supported one on either side of the trolley-arm and shiftable from and into position for engaging switch-guides respectively when the trolley-arm is moving from the single-line wire toward the double-line wires, and means for shifting said switch-arms, independently of each other, from and into their working position, whereby the trolley-arm may be engaged with either one of the switch-guides for carrying said arm from the single-line wire to the corresponding double-line wire, substantially as described.

4. The combination with the trolley-car and the single-line and double-line wires provided with a switch-guide substantially as described at the junction of the wires, of the trolley-arm

carried on the car, a switch-arm mounted on the trolley-arm in position for engaging the switch-guide of the trolley-line, and a connecting cord or line running from the switch-arm down the trolley-arm and into position for operation by the motor-man to throw the switch-arm into position for action, substantially as described.

5. The combination with a trolley-car, the trolley-lines having a switch-guide at the junction thereof, and with the trolley-arm and its switch-arm mounted thereon and supported to swing on the car, of the switch-arm-actuating cord support connected with the trolley-arm support and extending toward the end of the car, for carrying the switch-arm actuating cord or cords, substantially as described.

6. In a trolley switch-mechanism, the combination with the trolley-arm, of a swinging switch-arm pivotally supported thereon near the line-engaging end thereof, and means for elevating and lowering the switch-arm on the trolley-arm, substantially as described.

7. The combination, in a trolley-arm adapted for use in connection with a switch-mechanism of the class specified, of the trolley-arm and its roller, a switch-arm shiftable supported on the trolley-arm and carrying a roller, and a guard on the trolley-arm and located alongside of the shiftable roller for guarding this against engagement with falling cross wires, substantially as described.

8. The combination, in a trolley-arm adapted for use in connection with a switch-mechanism of the class specified, of the trolley-arm and its roller, a switch-arm pivotally supported on the trolley-arm and carrying a roller mounted on a stud projecting from the outer side of said switch-arm, and a wire-guard connected at one end with the outer end of said roller-stud and at the other end brought against and secured to the switch-arm, whereby the roller is protected from the engagement thereunder of the line-wires, substantially as described.

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