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PATENTED AUG. 13, 1907.

R. M. & J. M. VAN EATON.
SWITCH OPERATING DEVICE FOR STREET RAILWAYS.

APPLICATION FILED JAN. 7, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

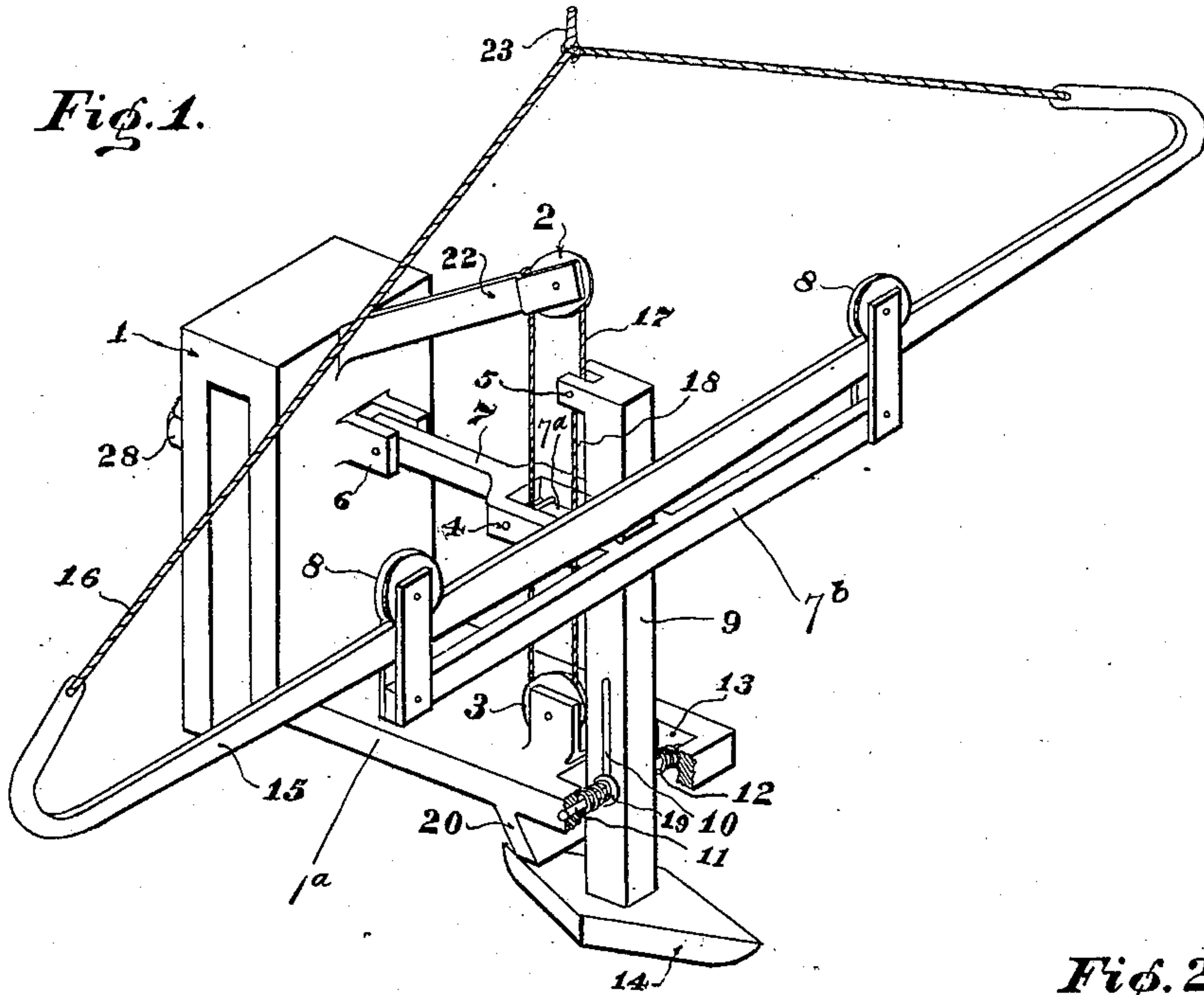
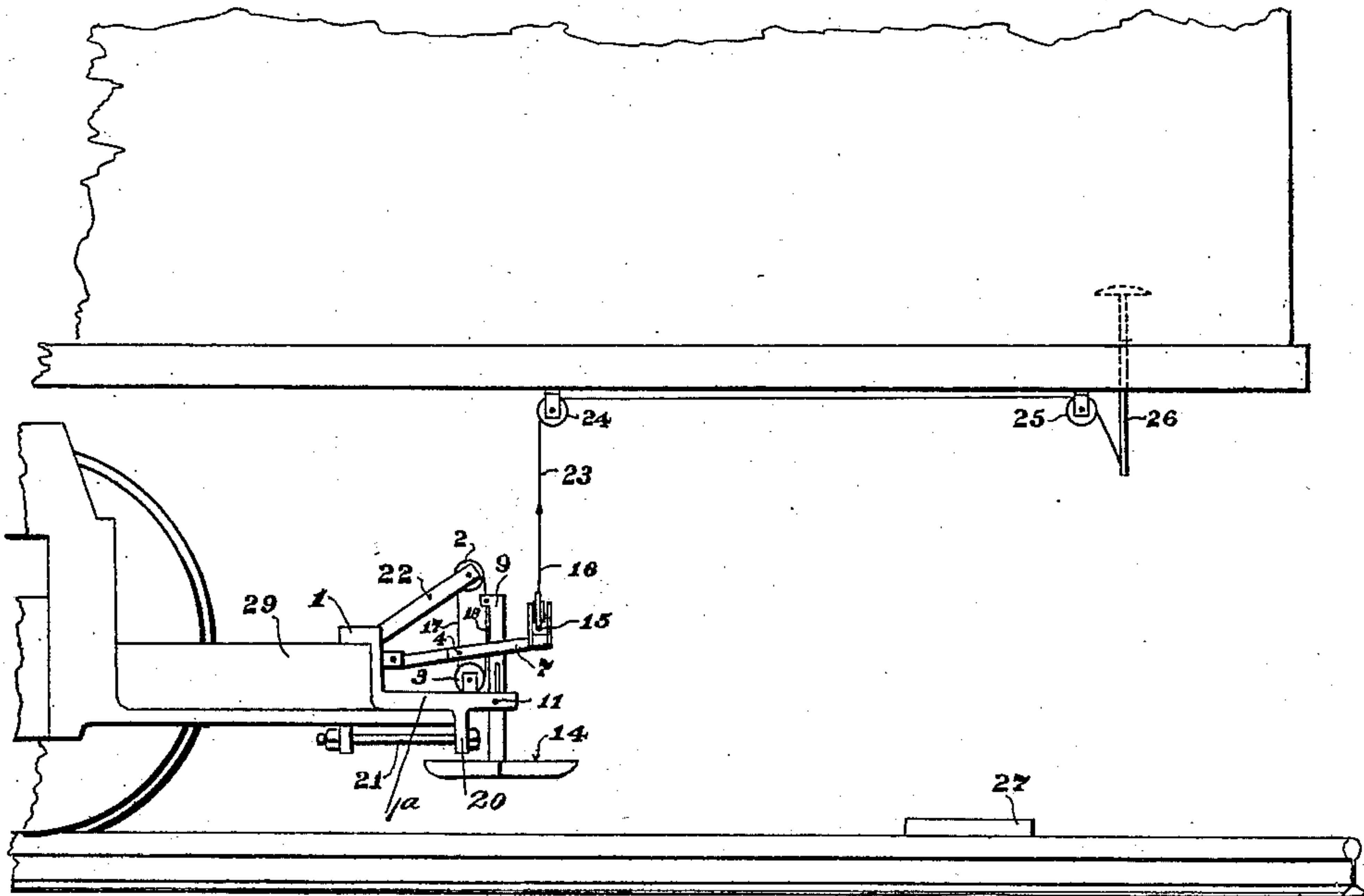


Fig. 2.



Witnesses.

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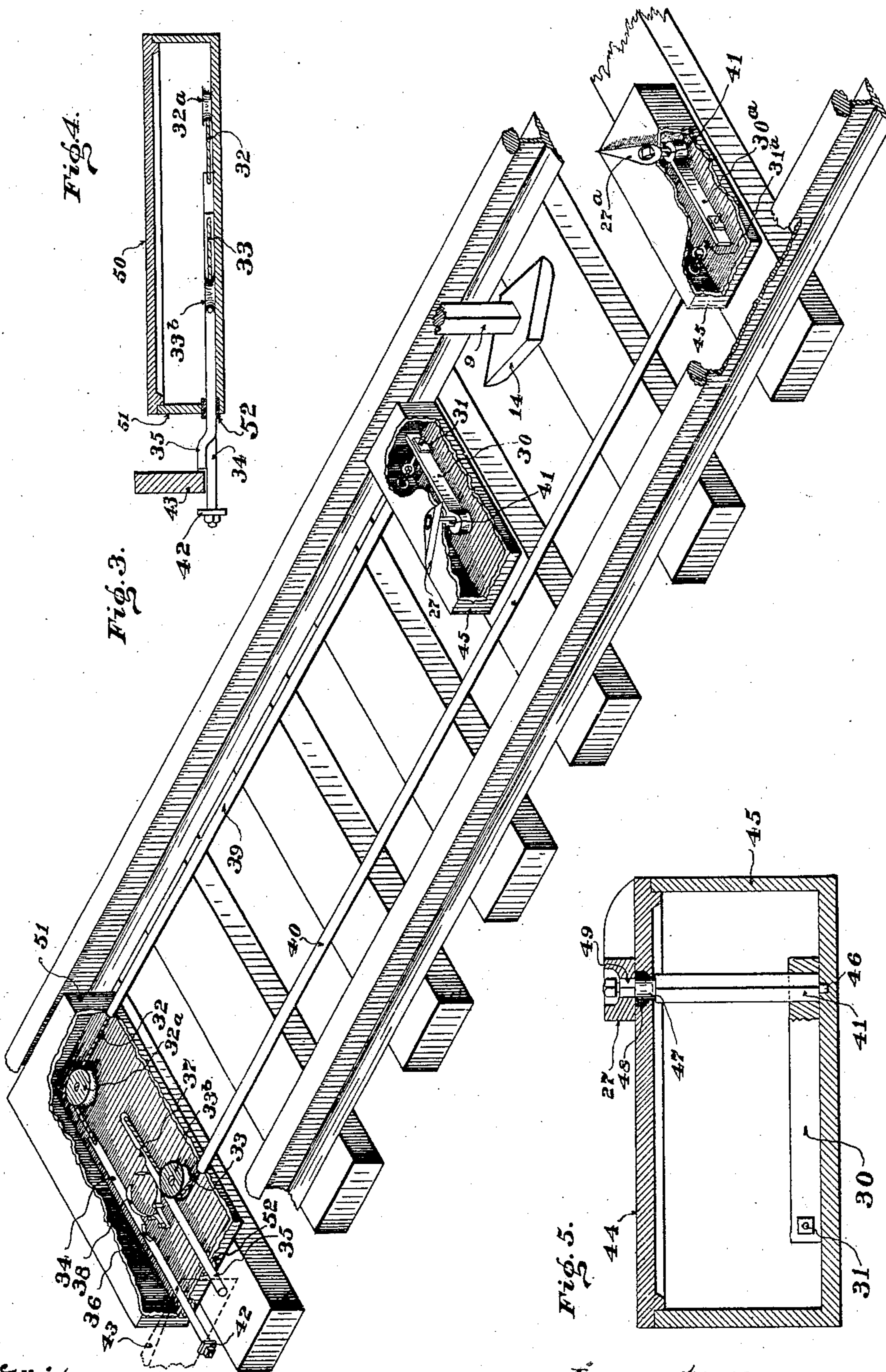
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Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD M. VAN EATON AND JULIA M. VAN EATON, OF PUEBLO, COLORADO.

SWITCH-OPERATING DEVICE FOR STREET-RAILWAYS.

No. 863,475.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed January 7, 1907. Serial No. 351,206.

To all whom it may concern:

Be it known that we, RICHARD M. VAN EATON and JULIA M. VAN EATON, citizens of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Switch-Operating Devices for Street-Railways; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in switch operating devices for street railways.

The object of the invention is to provide a switch operating device adapted to be controlled by a motorman or car operator without the necessity of his leaving or stopping the car.

A further object is to provide a device of this character by means of which a switch may be operated on a curved or straight track.

With the above and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a perspective view of a part of the switch operating device carried by the car; Fig. 2 is a side view of a portion of a car, showing the application thereto of the part shown in Fig. 1; Fig. 3 is a perspective view of a portion of the road bed and tracks of the railway, showing the arrangement of the stationary part of the operating device and the manner in which said part is engaged with the switch point; Fig. 4 is a vertical sectional view through the switch box; and Fig. 5 is a similar view through one of the lever boxes which are arranged between the tracks of the railway.

In Figs. 1 and 2 of the drawings is shown the construction and arrangement of that part of the operating device which is carried by the car, said part comprising an inverted U-shaped bracket 1 having on its lower end a forwardly-projecting, right angularly-disposed bar or plate 1^a. The bracket 1 is adapted to be engaged with a portion of the car frame 29 and is secured to the latter by means of a set screw 28 and by a bolt 21 adapted to be engaged with a downwardly-projecting apertured lug 20 formed on the underside of the plate 1^a and with a similar lug formed on and projecting below the frame 29, as shown.

On the outer side of the bracket 1 adjacent to its upper end is a forwardly-projecting, upwardly-inclined arm 22. In the bifurcated outer end of the arm 22 is journaled a pulley 2. On the upper side of the plate 1^a near the outer end thereof is formed a pair of upwardly-projecting, bearing lugs, in which is journaled a pulley 3. Around the pulleys 2 and 3 is adapted to travel an endless operating cord or cable 18.

On the outer side of the bracket 1 below the arm 22 is formed a pair of forwardly-projecting apertured ears or lugs 6, in which is pivotally-mounted a forwardly-projecting operating arm 7 having an enlarged outer end, in which is formed a longitudinally-disposed slot or recess 7^a.

On the forward end of the enlarged portion of the arm 7 is formed a cross bar 7^b, said bar projecting laterally on each side of the arm 7, as shown.

On the ends of the laterally-projecting portions of the cross bar 7^b are arranged upwardly-projecting, bearing plates, between the upper ends of which are journaled rollers 8.

Arranged between the rollers 8 and the upper side of the cross bar 7^b is an equalizing hanger bar 15, upon which the bearing rollers 8 are adapted to travel to slidably support the outer end of the arm 7 and the cross bar 17. The opposite ends of the hanger bar are turned upwardly and inwardly, and to said inwardly-turned ends are connected the opposite ends of a cord or cable 16. The cord or cable 16 is connected midway between its ends to an operating cable 23, said cable 23 passing upwardly around guide pulleys 24 and 25 journaled in suitable bearings on the under side of the car platform, as shown.

To the forwardly projecting end of the cable 23 is connected the lower end of a push rod 26, which is slidably-mounted in the platform of the car and projects upwardly above the same, and is provided with a head, whereby the same may be readily engaged and operated by the foot of the motorman.

The cable 17 is arranged to work through the aperture 7^a in the outer end of the arms 7 and in said apertured or slotted end of the arm is arranged a transversely-disposed pin 4, by means of which said end of the arm 7 is connected to the inner stretch of the cable, as shown in Fig. 1 of the drawings.

Slidably-mounted in the outer end of the slot 7^a is the standard 9 of a tripping device, by means of which the portion of the switch operating mechanism on the railway is actuated. On the lower end of the standard 9 is arranged a shoe 14, which is preferably diamond-shaped or pointed at each end. On the upper end of the standard 9 are formed rearwardly-projecting apertured lugs, in which is arranged a pin 5, by means of which the standard 9 is connected to the outer stretch of the cable 17 and by which said standard 9 of the trip device are actuated through the movement of the arm 7, as will be hereinafter described. The lower end of the standard 9 projects through a slot or aperture 13 formed in the forward end of the plate 1^a, as clearly shown in Fig. 1 of the drawings. In the bar 9 adjacent to its lower end is formed a vertical, transversely-disposed slot 10, in which is arranged a transversely-disposed guide rod 11 the ends of which are secured in

the plate 1^a at the opposite ends of the slot 13. On the guide rod 11 adjacent to each side of the standard 9 are arranged washers 19, between which and the end walls of the slot 13 are arranged coiled springs 12. The tension of the springs 12 are exerted to yieldingly hold the standard 9 of the trip device in a central position.

The portion of the switch operating mechanism arranged on the road bed and between the tracks of the railway, as shown in Figs. 3, 4 and 5, consists of a pair of substantially triangular trip tongues 27 and 27^a mounted on the squared upper ends of vertically-disposed shafts 41, which are journaled in the upper and lower sides of suitable casings or boxes 45 secured to the cross ties or road bed of a railway.

To the shafts 41 within the boxes 45 are secured operating levers 30 and 30^a. Adjustably-connected to the free end of the operating lever 30 by means of an eye-bolt 31 is an operating cord or cable 32, the forward end of which passes around a guide pulley 32^a journaled in the switch box 51 arranged between the tracks of the railway opposite to the switch point thereof. To said forward end of the cable 32 is connected an operating rod 34, which extends through one end of the box 51 and projects beneath the switch point 43. The projecting end of the rod 34 has secured thereto a switch engaging plate 42, by means of which the switch point is opened or drawn away from the rail to permit of the passage of a car onto a curved or side track.

To the free end of the operating lever 30^a is connected one end of an operating cable 33, said end of the cable being adjustably-connected to the lever 30^a by means of an eye-bolt 31^a. The opposite end of the cable 33 is adapted to pass around a guide pulley 33^b, which is also mounted in the switch box 51. The end of the operating cable 33, after passing around the pulley 33^b, is connected to the inner end of a switch operating rod 35, the outer end of which projects through the end of a switch box and is adapted to be engaged with the inner side of the switch point, whereby when the cable 33 is operated, the switch point will be closed into engagement with the rail to permit a car to pass along the straight track. The cable 32 is covered by and adapted to work through a protecting tube 39, while the cable 33 works through a protecting tube 40. The switch operating rods 34 and 35 are adapted to work through stuffing boxes 52 arranged in the end of the switch box. These stuffing boxes 52 prevent the entrance of dirt or foreign matter within the boxes which might interfere with the operation of the parts therein. The operating rods 34 and 35 are adapted to be held in their adjusted positions by means of a spring 38 secured to the bottom of the box 51 between the rods, as shown. The arms or blades of the spring 38 are adapted to be engaged with suitable recesses 36 and 37 formed in the adjacent sides of the rods 34 and 35, whereby the rods will be more firmly held in the positions they assume when the switch point is in an open or closed position.

The lever boxes 45, in which the trip tongues 27 and 27^a and the operating levers 30 and 30^a are mounted, are arranged at a sufficient distance apart to enable the operator or motorman of an approaching car to project the trip device carried thereby into engagement with either of the tongues 27 or 27^a and to retract the same without danger of engaging the other tongue. It will

also be understood that the movement of one of the tongues 27 or 27^a will move the other in an opposite direction and in a position to be engaged by the next car to move the switch point in an opposite direction. The lever boxes 45 are provided with removable cover plates 44, through which the upper reduced cylindrical ends 47 of the operating shafts 41 project. Said reduced ends 47 are journaled in stuffing boxes 48 by means of which water or other foreign matter is prevented from entering the boxes. The lower ends of the shafts 41 are reduced and journaled in the bottom of the boxes, as shown at 46. The switch box 51 is also provided with a removable cover plate 50.

In operation, as a car approaches one of the trip tongues 27 or 27^a and it is desired to operate the switch, the motorman presses down upon the push rod 26, thus drawing upon the cable 23 and lifting the forward end of the arm 7, which being attached to the inner stretch of the cable 71 by means of the pin 4 will draw said inner stretch of the cable upwardly, thereby pulling the outer stretch of the cable downwardly. The standard 9 of the trip devices being connected by the pin 5 to said outer stretch of the cable, will also be projected downwardly, thereby bringing the shoe 14 on the lower end of the same into position to engage one or the other of the switch tongues as hereinbefore described. The shoe 14 upon being brought into engagement with the trip tongues will turn the same and the operating levers connected thereto to open or close the switch point, as will be understood.

By providing a loose connection for the standard 9 of the trip device, said device may be readily operated upon a curve in the track, as when the car is passing around the curve, the equalizing bar 15 will slide laterally under the supporting pulley or cross bar of the arm 7, thus allowing the parts of the device carried by the truck of the car to follow the curve in the track as the truck passes around the same while the cable 23 and the parts attached thereto will move with the car body, as will be understood, thus preventing any binding of the parts and permitting the operation of the trip device irrespective of the relative position between the car body and the truck. The yielding connection between the lower end of the standard 9 and the plate 1^a on the bracket 1 prevents the breakage of any of the parts in case either of the trip tongues 27 or 27^a should be held against turning from any cause or should the shoe 14 be engaged with any immovable obstruction.

It will be understood that while the tripping device and shoe 14 are projected downwardly to an operative position through the lifting of the operating arm by means of the push rod 26 and the flexible connections 16 and 23 that said tripping device and shoe are retracted or raised to an inoperative position by the weight of the arm 7 and the parts attached thereto, which drop by gravity when the push rod 26 is released.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, as defined by the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters-Patent, is:—

1. A switch operating device comprising a stationary portion arranged in the road bed of a railway and a trip device adapted to be carried by a car, said stationary portion comprising lever boxes or casings, trip tongues pivotally-mounted on said boxes, operating levers arranged in said boxes and actuated by said trip tongues, a switch box, switch operating rods slidably-mounted in said box and projecting therefrom in position to engage the switch point, flexible connections arranged between said rods and said levers, and means to adjustably attach the ends of said connections with the ends of the operating levers, substantially as described.

2. A switch operating device comprising a stationary portion arranged in the road bed of a railway and a trip device adapted to be carried by a car, said stationary portion comprising lever boxes or casings, a vertically-disposed shaft journaled in said boxes and projecting through stuffing boxes in the upper sides thereof, trip tongues mounted on the projecting upper ends of said shafts, operating levers journaled on the latter to operate within said boxes, a switch box, switch operating rods slidably-mounted in said box and projecting through stuffing boxes in one end of the same, means on the end of one of said rods to engage the outer side of the switch point, a spring to yieldingly hold said rods in their adjusted positions, tubes arranged between said switch box and lever boxes, operating cables connected at one end to said operating rods in the switch box, and eye-bolts on the opposite ends of said cables whereby said ends are adjustably-connected to said operating levers in the lever boxes, substantially as described.

3. A switch operating device comprising a stationary portion arranged in the road bed of a railway and a trip device adapted to be carried by a car, said trip device comprising a supporting bracket adapted to be secured to the car truck, an operating rod pivotally mounted on said bracket, an endless cable connected to and operated by said arm, a tripping device connected to said cable and operated thereby, an operating mechanism arranged on the under side of the car body, and means whereby said mechanism is slidably connected to said operating arm, substantially as described.

4. A switch operating device comprising a stationary portion arranged in the road bed of a railway and a trip device adapted to be carried by a car, said trip device comprising a supporting bracket adapted to be secured to the car truck, a right angular, forwardly-projecting plate formed on said bracket, said plate having formed therein a transversely-disposed slot, an operating arm pivotally-mounted on the outer side of said bracket, pivotally-mounted guide pulleys, an endless cable arranged on said pulleys, means whereby the inner stretch of said cable is connected to said arm, a tripping device comprising a standard connected to the outer stretch of the cable, a shoe arranged on the lower end of said standard to engage trip tongues on the stationary portion of said switch operating device, an equalizing bar, means whereby the latter is slidably-connected with said operating arm, and a flexible operating device connecting said equalizing bar to the body of a car, substantially as described.

5. A switch operating device comprising a stationary portion arranged in the road bed of a railway, a trip device adapted to be carried by a car, said trip device

comprising a supporting bracket adapted to be secured to the car truck, an operating arm pivotally-mounted on said bracket, pivotally-mounted guide pulleys, an endless cable arranged on said pulleys, means whereby the inner stretch of said cable is connected to said operating arm, a tripping device comprising a standard connected to the outer stretch of said endless cable, a shoe arranged on the lower end of said standard and adapted to be engaged with trip tongues on said stationary portion of the operating device, means to yieldingly hold said tripping device in position, an equalizing bar, means whereby said bar is slidably connected to the outer end of said operating arm, a push rod arranged in the floor of the car, and a flexible connection between said push rod and said equalizing bar, substantially as described.

6. A switch operating device comprising a stationary portion arranged in the road bed of a railway, a trip device adapted to be carried by a car, said trip device comprising a supporting bracket adapted to be secured to the car truck, a forwardly-projecting slotted plate on said bracket, a pulley journaled on said plate, a forwardly-projecting arm arranged on said bracket, a pulley journaled in the outer end of said arm, an endless cable arranged on said pulleys, an operating arm pivotally-mounted on the bracket, said arm having a slotted outer end, means to connect said arm with the inner stretch of said endless cable, a tripping device comprising a slotted standard slidably-mounted in the aperture of said bracket plate and connected to the outer stretch of said endless cable, a tripping shoe on the lower end of said standard, springs to hold the latter in position in the aperture in said plate, a cross bar on the outer end of said arm, pulleys arranged on the outer ends of said cross bar, an equalizing bar adapted to slidably-engage said pulleys, a push rod arranged in the platform of the car, and a flexible connection between said push rod and said equalizing bar, substantially as described.

7. A switch operating device comprising a stationary portion arranged in the road bed of a railway and a trip device adapted to be carried by a car, said trip device comprising a supporting bracket adapted to be secured to the car truck, a forwardly-projecting, right angularly-disposed plate on the lower end of said bracket, said plate having formed near its outer end a transversely-disposed slot, a tripping device slidably-mounted in said slot, said device comprising a standard having formed therein a vertically-disposed slot, a guide rod arranged in said slot and secured at its opposite ends in said plate, washers on said rod adjacent to the opposite sides of the standard, coiled springs arranged between said washers and the end walls of the slot in said plate, a shoe arranged on the lower end of said standard, an operating arm pivotally-mounted on said bracket, a flexible connection between said arm and said standard, an equalizing bar having a slidable connection with the outer end of said operating arm, a push rod in the platform of said car, a flexible connection between said push rod and equalizing bar, whereby said operating rod is raised or lowered to actuate said tripping device, substantially as described.

In testimony whereof we have hereunto set our hand in presence of two subscribing witnesses.

RICHARD M. VAN EATON.
JULIA M. VAN EATON.

Witnesses:

GEORGE ARTHUR MCCOY,
CLEVIA SMITH.