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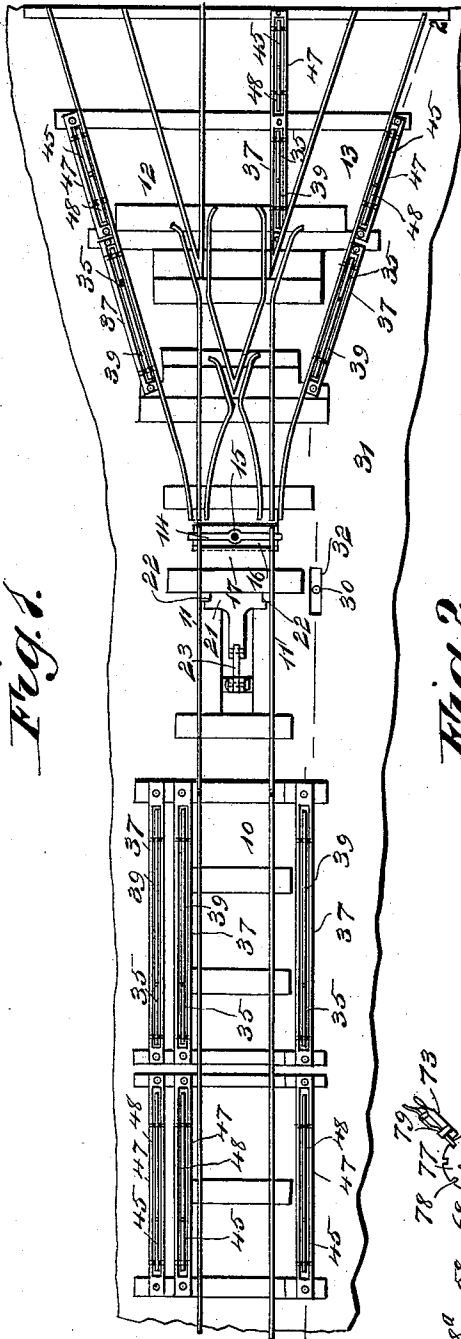
3 Sheets—Sheet 1.

J. JOYCE.
RAILROAD SWITCH.

No. 532,668.

Patented Jan. 15, 1895.

Fig. 1.



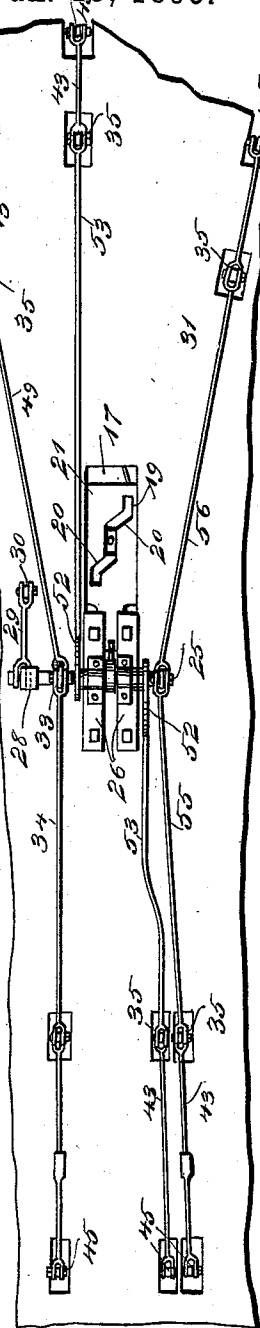
WITNESSES:

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Fig. 2.



Fig. 3.



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(No Model.)

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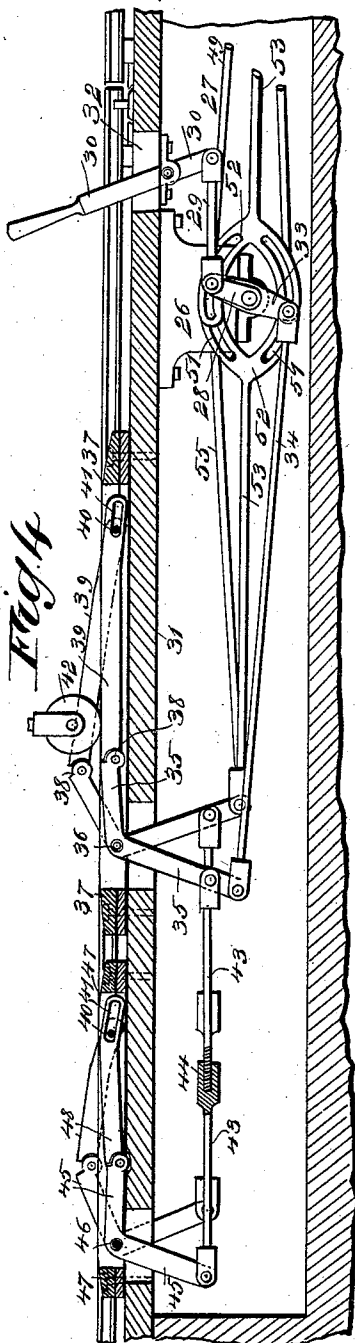


Fig. 4

Fig. 5

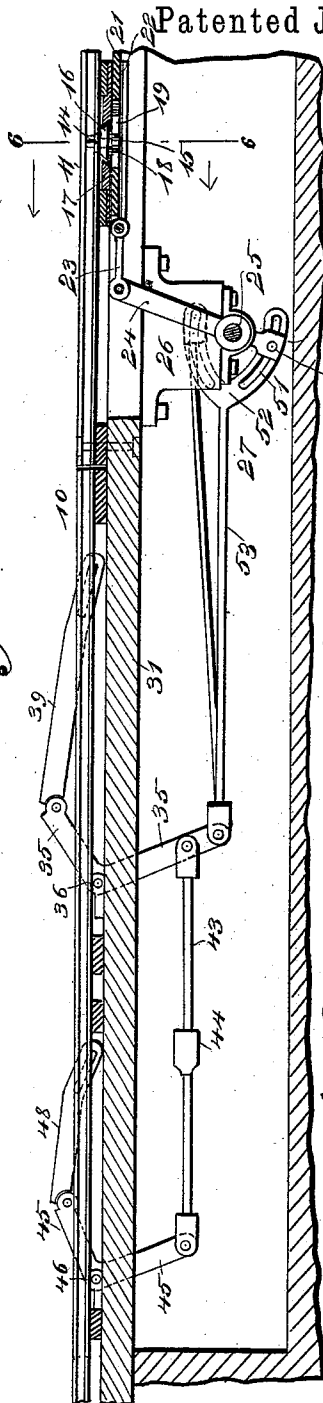
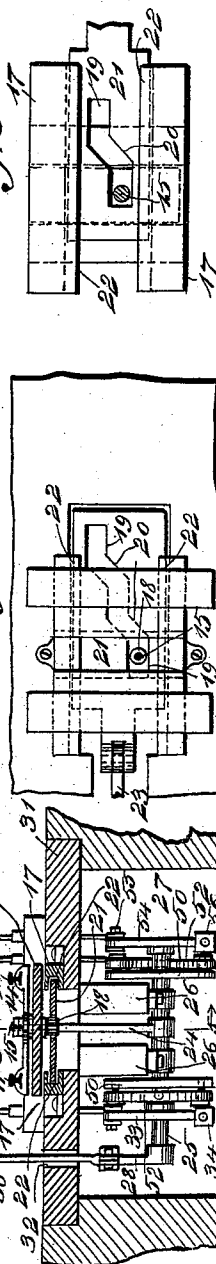


Fig. 6

Fig. 7



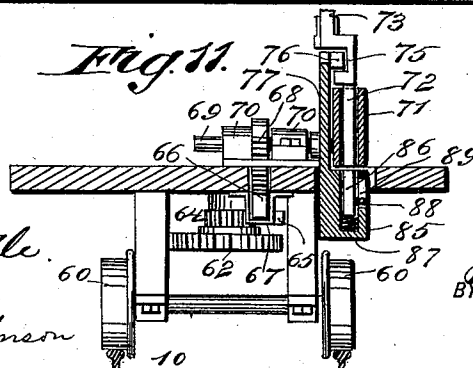
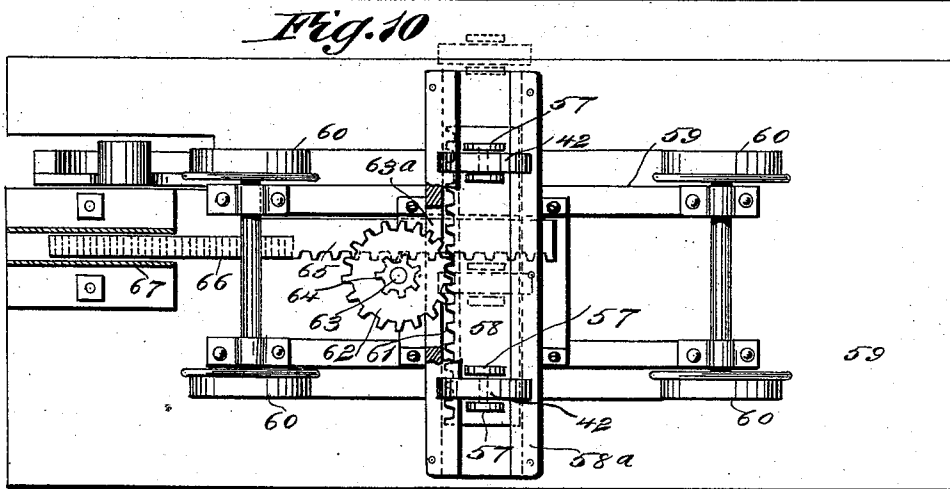
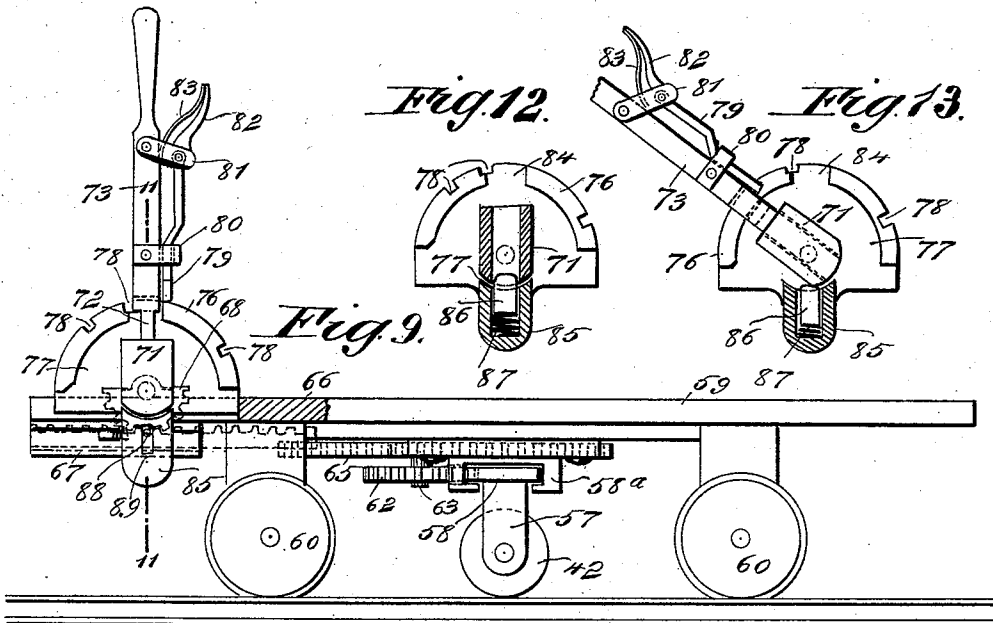
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3 Sheets—Sheet 3.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES JOYCE, OF DE LAMAR, IDAHO.

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 532,668, dated January 15, 1895.

Application filed June 19, 1894. Serial No. 515,062. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOYCE, of De Lamar, in the county of Owyhee and State of Idaho, have invented a new and Improved Railroad-Switch, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of railroad switches which are adapted to be operated by a moving train and also to improvements in the means of operating the switch.

The object of my invention is to produce a simple and comparatively inexpensive switch working mechanism which may be applied to any ordinary switch, whether it be a two-way, three-way, or any other usual kind of switch, to provide means for throwing the switch by the movement of a passing train, to arrange the contact rails which are struck by mechanism on the car and which work the switch in series so that they will be struck successively without any objectionable shock, either to themselves or to the car mechanism, and to provide contact wheels on the car and mechanism for operating the same which enables the wheels to be brought into contact with any desired series of contact rails on the track so that the switch may be thrown in the desired direction.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of a three-way switch provided with my improved working mechanism. Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1. Fig. 3 is an inverted plan view of the switch-working mechanism. Fig. 4 is an enlarged detail sectional view on the line 2—2 of Fig. 1, and shows minutely the mechanism for throwing the switch. Fig. 5 is a longitudinal section on the line 5—5 of Fig. 6. Fig. 6 is a cross section on the line 6—6 of Fig. 5, and shows the arrangement of the cranks and connecting mechanism on the main shaft which is arranged adjacent to the switch bar. Fig. 7 is an inverted plan view of the slide mechanism for moving the switch

bar. Fig. 8 is a view, similar to Fig. 7, of the slide mechanism adapted for use on a two-way switch. Fig. 9 is a sectional elevation of the mechanism carried by a car, engine, or other vehicle for engaging the contact rails of the switch-working mechanism on the track. Fig. 10 is an inverted plan view, partly in section, of the car mechanism. Fig. 11 is a cross section on the line 11—11 of Fig. 9. Fig. 12 is a detail sectional view of the lock for securing the adjusting lever on the car; and Fig. 13 is a detail view, partly in section, showing the adjusting lever in an inclined position and fastened to the adjacent quadrant.

I have illustrated my invention in connection with a three-way switch, but it may be used in connection with a two-way switch as well. The main track 10 is provided with switch rails 11 which move in the usual way so as to align with either of the sidings 12 or 13, and the switch rails are secured to a common switch bar 14 which is provided with a center pin or bolt 15 extending downward through a transversely moving slide 16, which slide is held to a suitable base plate 17, and the bolt 15 has on it an anti-friction roller 18 which is held in the slot 19 of the slide plate 21, this slot having inclines 20 so that when the slide is moved the inclined walls of the slot engage the roller 18 and will throw the said roller to one side, thus moving the slide 16 and switch bar 14.

It will be seen that the slide plate 21, as shown in Figs. 3 and 7, has three straight sections and two inclines 20 in the slot, and these parts are arranged so that when the slide plate is in a central position with the roller 18 opposite the middle straight section of the slot, the switch bar will be locked in a central position so as to close the switch, but if the slide plate 21 is moved either forward or backward the roller will be thrown by one of the inclines so as to throw the switch bar to the right or left, and the roller will then rest in one of the straight end portions of the slot and the switch will be locked in an open position so as to hold it in connection with one of the sidings. The slide plate 21 is movable longitudinally in the slideway 22 of the base plate 17.

If the apparatus is applied to a two-way switch, the slide plate has only one incline 20, as shown in Fig. 8. The slide plate is pivoted

to a connecting rod 23 by which it is moved, and this rod is pivoted to a crank 24 on the main shaft 25, which is journaled on brackets or hangers 26 in a pit 27 beneath the track, the shaft extending transversely of the track so that the mechanism may be conveniently connected with it, as described presently.

The shaft 25 is provided with a crank 28, see Figs. 2 and 6, and this connects by a rod 29 with a lever 30 which is arranged vertically and is fulcrumed on the top 31 of the pit 27, although it may be fulcrumed on any suitable support and it swings in a slot 32. It will thus be seen that by moving the lever 30, the shaft 25 may be turned, the slide plate 21 moved and the switch operated by hand. The shaft 25 is provided with a double crank 33, that is, a crank which extends from diametrically opposite sides of the shaft, and one end of the crank 33, the lower end as shown in the drawings, is pivoted to a connecting rod 34 which extends parallel with the main line track 10 and is pivoted to an elbow lever 35 which is fulcrumed, as shown at 36, on the roadbed and extends upward through a split rail 37 and is pivoted, as shown at 38, to a contact rail 39, thus forming toggle levers, as the contact rail is at one end pivoted on a pin 40 which extends through a slot 41 in the contact rail and is held in the split rail 37. I have shown the split rail 37 for supporting and guiding the lever 35 and contact rail 39, but it will be understood that any other suitable support may be used for the purpose.

The upper end of the lever 35 serves also as a contact rail, and it will be seen that when the wheel 42, see Fig. 4, or equivalent device strikes either rail 39 or lever 35 it will tilt the lever, pull the rod 34 and turn the shaft 25 so as to move the slide plate 21 and shift the switch. As illustrated, the pulling of the rod 34 will shift the switch to the right so as to connect the main line with the siding 13.

It will be seen that if the lever 35 and rail 39 are elevated sufficiently to give the necessary throw to the switch, there will be considerable shock when the device on the car strikes the said parts, and to avoid this the lever 35 has connected to it a rod 43 which is adjustable longitudinally by means of a screw coupling 44 and the rod connects with a lever 45 exactly like the lever 35, as already described, this lever 45 being fulcrumed on the roadbed, as shown at 46, in a split rail 47 or equivalent device, and it connects with a contact rail 40, exactly like the rail 39 and arranged in a similar way. By arranging the contact levers or rails in series in this way, one in advance of the other, it is not necessary to project either of them very high above the roadbed, as when the wheel 42 strikes the lever 45 and rail 48 it will depress the said parts and pull the rod 43, lever 35 and rod 34 so as to partially open the switch to the siding, and when the wheel comes in contact with the lever 25 and rail 39 it will complete the operation and throw the switch wide open.

The throw is thus divided and all excessive shock avoided.

To provide for throwing the switch back, the upper end of the crank 33 is pivoted to a connecting rod 49 which extends along beneath the siding 13 and is connected with levers and contact rails on the siding exactly like those described above.

To provide for throwing the switch to the center, from either side, the shaft is provided with cranks 50 which extend from opposite sides of it and each crank 50 has at opposite ends pins 51^a, see Fig. 5, which enter the curved slots 51 of the forks 52 which have shanks or rods 53 extending in opposite directions beneath the main track, and these rods 53 are connected with levers 35 and 45 and contact rails 39 and 48 in the manner already described and by bringing a wheel 42 or equivalent device into engagement with the said rails and levers, the switch may be centered from either side.

It will be seen by reference to Figs. 4 and 5 that if the switch is set to a siding and one of the rods 53 is pulled, the fork 52 will be drawn back and one of the arms of the fork will pull on one of the pins of the crank so as to center the switch, the pitching of the crank moving the shaft 25 just far enough to pull the slide plate 21 into a position to hold the roller 18 in the central straight portion of the slot 19.

To provide for throwing the switch to the siding 12 a crank 54 is attached to the shaft 25 and to the upper end of this is a connecting rod 55 which extends parallel with the main line and is connected with contact rails and levers, as already described, while to the lower end of the crank is pivoted a rod 56 which extends beneath the siding 12 and also connects with contact rails and levers, so that by depressing the said rails and levers on either the siding or the main track the shaft 25 may be turned and the switch opened to the siding.

The contact rails and levers may be depressed by any suitable means, but the mechanism illustrated in Figs. 9 to 13 is preferably employed, and as here shown wheels 42 are employed and arranged to strike the said rails and levers, these wheels being journaled in brackets 57 which hang from a transversely moving slide 58 which is held in the slideway 58^a on the under side of the car 59, but it will be understood that this car may be of any ordinary kind, such as an electric car, horse car, cable car, steam car or locomotive. The car illustrated is provided with the ordinary wheels 60 to run on the track.

The slide 58 has on one edge teeth 61 which engage a pinion or cog wheel 62 on the vertical shaft 63, the cog wheel turning in a slot 63^a in the slideway 58^a, see Fig. 10, and the shaft 63 is also provided with a pinion 64 which meshes with and is driven by a longitudinally sliding rack 65 which is held above the slideway 58^a, this rack connecting with a

second rack 66 held in a casing 67 and which has teeth on its upper side to engage the segmental rack or mutilated gear 68 on the shaft 69, this shaft being journaled in suitable bearings 70 and having attached to one end a sleeve 71 which is adapted to receive the reduced lower end 72 of the adjusting lever 73 which is reduced on one side, as shown at 75, to enable it to slide over the flange 76 of the quadrant 77, and the flange 76 serves to hold down the lever.

The quadrant 77 is rigidly attached to the car and is provided with notches 78 which are adapted to engage a locking bar 79 which slides through a guide 80 on the lever 73 and is connected to the lever by links 81, the locking bar being operated by means of a hand latch 82 which is pressed by a spring 83 so as to normally hold down the lever and locking bar.

The arrangement of the lever, locking bar and quadrant is substantially like that used on many similar devices and is not claimed in detail.

It will be seen that by turning the lever the shaft 69 is turned and the racks and gear mechanism connected therewith cause the slide 58 to move so as to bring the wheels 42 into the desired position above the contact rails and levers, and the notches 78 are arranged in such a way that when the lever is locked in engagement with one of them it holds the wheels 42 in position to engage the rails and levers and throw the switch to one side, while by engaging another notch the lever is held so as to bring the wheels 42 into position to center the switch, and by locking the lever in the last notch, the wheels 42 are shifted so as to throw the switch to the other siding. The lever may be moved from the sleeve 71 by turning the sleeve and lever into a vertical position, and this brings the flange at the lower side of the recess 75 and opposite the wide notch 84, see Fig. 12, in the flange 76 of the quadrant.

When the sleeve 71 is in a vertical position its lower end, which is convex, is opposite the concave upper end of a socket 85 which is secured to the quadrant 77 and in this socket is a locking bar 86 which is pressed upward by a spring 87, so that it enters the sleeve 71 and locks the sleeve in position and consequently when the lever 73 is removed the sleeve cannot be turned and the switch mechanism tampered with. When the lever is inserted, however, the locking bar 86 is pushed down so as to permit the movement of the sleeve. The movement of the bar 86 is limited by a pin 88 which moves in a slot 89 in one side of the socket 85.

From the foregoing description it will be seen that the switch may be accurately thrown from the moving car without excessive shock, and it will also be seen that the switch may be thrown by hand as well as can the ordinary switch.

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

1. The combination, with the switch and switch bar, of a transversely movable slide plate carrying the switch bar, a longitudinally movable slide plate having an angular slot therein, and a bolt secured to the switch bar and extending downward through the upper slide and into the slot of the lower one, substantially as described.

2. The combination of the switch rails, a crank shaft disposed below such rails, shifting devices connecting the switch rails and the shaft operated by the turning of the shaft to set the switch rails, an elbow lever pivoted to project with its upper end above the rails and having its lower end connected with the crank shaft and a contact rail held adjacent to the track and pivotally connected with the upper projected end of the elbow lever, as set forth.

3. The combination, with the switch rails, the transversely movable slide beneath the rails, the switch bar secured to the rails and slide and a base plate supporting the slide, of the longitudinally movable slide plate mounted in the base plate and provided with an angular slot, a bolt secured to the switch bar and extending into the slot, the lever-operated crank shaft, and an operative connection between the shaft and the slotted slide plate, substantially as described.

4. The combination with the switch rails, the longitudinally movable slotted slide plate and the bolt connected with the rails and projected in the slot of the slide plate, of a crank shaft disposed below the rails, having its crank member projected up in line with the slide plate and having a pivotal connection therewith, said crank shaft having a second crank member, and the hand lever and the rod connection between it and the said second crank member, all arranged substantially as shown and for the purposes described.

5. The combination with the switch rails, the crank shaft journaled below the same and mechanism for shifting the rails operated by the said crank shaft, of a guide member held parallel with the main rails, an elbow lever journaled in such guide, having its lower end connected by a rod with the crank shaft and a contact rail, longitudinally movable in the guide member and pivotally connected therewith and to the upper end of the elbow lever, all substantially as shown and described.

6. The combination, with the switch, the crank shaft, and the mechanism for moving the switch by the turning of the crank shaft, of the elbow levers fulcrumed on the roadbed of the track and having their lower ends connected together and their upper ends pivoted to contact rails, and a connection between one of the levers and the crank shaft, substantially as described.

7. The combination, with the crank shaft,

the switch, and the mechanism for working the switch by the turning of the shaft, of the double cranks on the crank shaft, the slotted forks connected with the cranks, the contact
5 rails and levers on opposite sides of the switch, and an operative connection between the contact levers and the slotted forks, substantially as described.

8. The combination, with the car or other
10 vehicle, of the transversely movable slide mounted thereon, the contact wheels hung on the slide, the longitudinally movable racks on the car, geared to the slide, an adjusting lever geared to the racks, and mechanism for

fastening the lever in a desired position, substantially as described. 15

9. The combination, with the car, the contact wheels thereon, the oscillating shaft on the car, and the mechanism for moving the wheels from the shaft, of a sleeve on the shaft, 20 a rigid socket beneath the sleeve, a locking bar held in the socket to engage the sleeve, and a lever detachably secured in the sleeve, substantially as described.

JAMES JOYCE.

Witnesses:

WILLIAM L. HUGLER,
JOHN EDGAR.