No. 741,644. PATENTED OCT. 20, 1903.

G. W. FERNSIDE.

MECHANISM FOR OPERATING RAILWAY SWITCHES.

APPLICATION FILED OCT. 28, 1901.

NO MODEL.

Fig. 1.

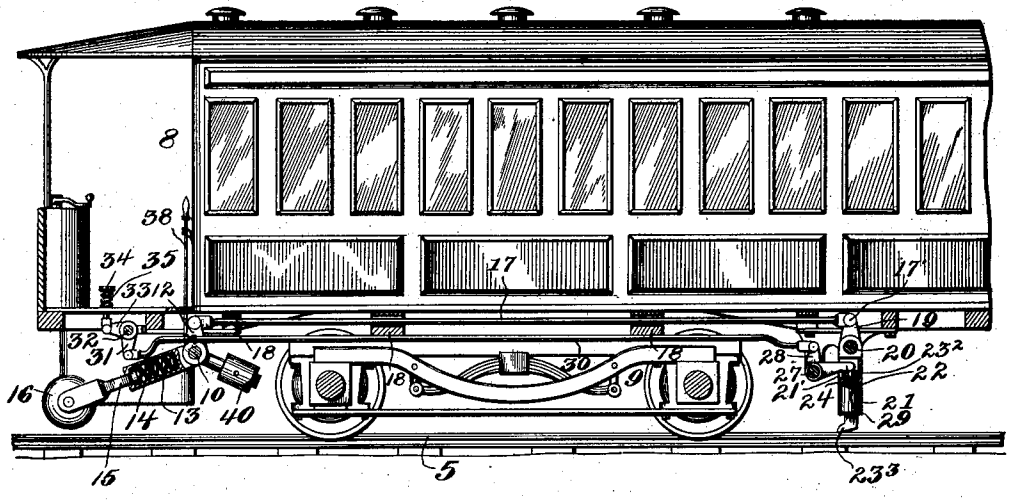


Fig. 2.

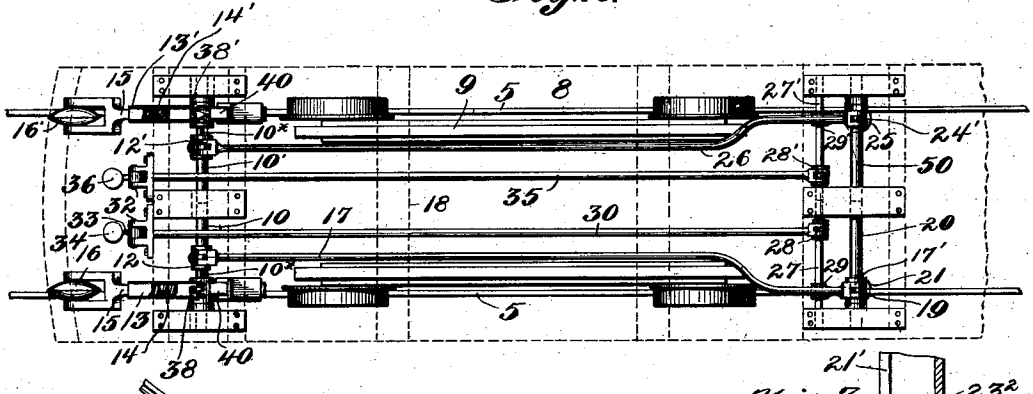


Fig. 3.

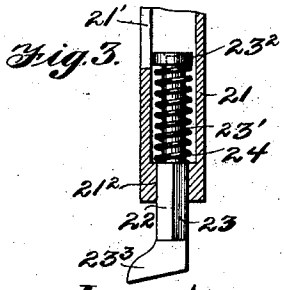


Fig. 4.

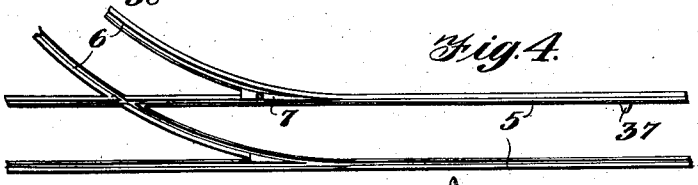
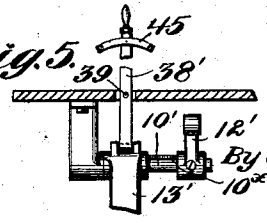


Fig. 5.



Witnesses:
Frank J. Campbell.
R. W. Pittman

Inventor:
George W. Fernside,
By his Attorney
F. A. Richards.

No. 741,644. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

GEORGE W. FERNSIDE, OF HARTFORD, CONNECTICUT.

MECHANISM FOR OPERATING RAILWAY-SWITCHES.

SPECIFICATION forming part of Letters Patent No. 741,644, dated October 20, 1903.

Application filed October 28, 1901. Serial No. 80,210. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. FERNSIDE, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Mechanism for Operating Railway-Switches, of which the following is a specification.

My invention relates to mechanism for operating railway-switches, and has for its object the provision of improved devices under the control of the motorman for accurately and expeditiously accomplishing this result, and that, too, whether the car is going in one direction or in the other direction.

In the accompanying drawings, in which like numerals designate similar parts throughout the several views, Figure 1 is a side elevation of a street-railway car with the sills and one of the trucks partly in section, showing my invention applied thereto. Fig. 2 is a plan view showing the invention applied to the under side of the car, the body of said car being represented in dotted lines. Fig. 3 is a detail view, partially in section, showing one of the plungers for actuating the lever mechanism which controls the switch-shifting device. Fig. 4 is a plan view of a railway-track, showing the pivoted switch therein and the stop with which the end of the plunger illustrated in Fig. 3 engages; and Fig. 5 is a detail view of one of the levers and its connections for laterally actuating the switch-shifting devices.

Referring to the drawings, the numeral 5 indicates a railway-track, 6 a branch track or siding, and 7 a pivoted switch, all of common construction.

Designated by the numeral 8 is a car, shown as of the double-truck electric street-railway kind, a portion only of said car being illustrated, and by the numeral 9 is the truck of said car, these parts being of the usual construction. Beneath the body of the car my improved switch-shifting mechanism is preferably located, and this mechanism consists of rock-shafts 10 10′, one set located at one end and the other set (not shown) at the opposite end of said car. To the rock-shaft 10 is rigidly secured an arm 12, and splined upon the rock-shaft 10, so that it may have a limited sliding movement thereon, is a preferably hollow arm 13, a similar arm 13′ being fitted in the same manner upon rock-shaft 10′. Within each of these arms is a spring 14, as illustrated in Figs. 1 and 2, and each of these springs bears at its forward end against the head of a stem 15, said stem being bifurcated or otherwise constructed at its lower end to receive a roller 16, having a conical or beveled periphery for accomplishing a purpose hereinafter set forth. For normally raising the arms 13 13′, carrying the switch-shifting rollers, weighted arms 40 may be employed, as illustrated in Fig. 1, or other devices may be substituted for the weights for accomplishing this purpose, if desired. To the arm 12 is articulated a connecting-rod or pitman 17, which passes through guides 18, secured either to the truck 9 or to the under side of the floor of the car 8, as shown in Fig. 1. This connecting-rod 17 is articulated at 17′ to a crank-arm 19, rigidly secured to a rock-shaft 20, and also fixedly secured to this rock-shaft 20 is a depending tubular sheath 21, slotted on one side at 21′ and having an opening 21^2 of rectangular formation in its lower side. In this sheath is mounted for vertical reciprocation a plunger, (designated by 22,) said plunger having an angular portion 23, conforming to the shape of the opening 21^2, a shank 23′, a head 23^2, and a preferably inclined tip or nose 23^3. Surrounding the shank 23′ of the plunger is a spring 24, which bears at its upper end against the head 23^2 and at its lower end upon the bottom wall of the tubular sheath, and this spring normally tends to elevate the plunger within the sheath, so that the tip or nose 23^3 of said plunger will be held above the track, as illustrated in Fig. 1. Also journaled in bearings depending from the framework of the car is a second rock-shaft 50, having an arm 24′ and a depending sheath 25, similar to the sheath 21 illustrated in Fig. 3, and containing, as does said sheath 21, a spring-actuated plunger, and connected to this arm is a rod 26, articulated at its forward end to a crank-arm 12′ of the shaft 10′.

Journaled in bearings depending from the under surface of the car is a pair of rock-shafts in longitudinal alinement, which are designated by the numerals 27 and 27′, respectively, and to each of these rock-shafts is rigidly secured a crank-arm 28 28′, respec-

tively, and a laterally-projecting arm 29 29′, respectively. These arms 29 29′ enter the slots 21′ of the sheaths or depending tubular bodies secured to the rock-shafts 20 and 50, and, as will be obvious, when either rock-shaft is actuated by means hereinafter described the arm 29 or 29′, projecting therefrom, will be caused to bear against the head of the plunger in the sheath and force said plunger downward against the stress of its elevating-spring 24. Connected to the arm 28 of rock-shaft 27 is a rod or pitman 30, which extends along the top of the truck in line with the longitudinal axis of the car-body, as illustrated in Figs. 1 and 2, and is attached at its forward end to an arm 31, depending from a rock-shaft 32, journaled in bearings on the under side of the car-platform. This rock-shaft 32 also carries another arm 33, to which is articulated or against which bears a plunger 34, normally elevated by a spring 35 and adapted to be depressed against the action of said spring by the foot of the motorman. Arranged parallel to the rod or pitman 30 is a second rod or pitman 35, articulated at one end to the arm 28′ of rock-shaft 27′ and at its opposite end to an arm similar to the arm 31, above described, the devices just set forth being operated by a foot-actuated treadle or plunger 36 in the same manner as are the connecting-rod 30, the rock-shaft 27, and the arm 29.

As is well known, on street and other railways the side tracks or "turn-outs" are located sometimes on one side of the main track and again on the other side thereof, and it is a desideratum when the car is proceeding along the main track to be able to shift the switch in either direction desired when required—in other words, to open or close said switch as circumstance may demand—and in order to accomplish these results the switch-shifting devices must be capable of a considerable range of movement, so that at the exact time necessary the switch may either be closed or thrown open. To carry out this work, I arrange at the necessary points in the track stops or projections 37, one of which is shown in Fig. 4, and it will be understood that others will be disposed along the length of the line wherever needed. To permit the switch-shifting rollers 16 16′ to actuate the switches in order that the movement of the car may be positively controlled, these devices and the mechanism for actuating them are provided in duplicate sets, one set being located at one and the other at the opposite end of the car. While but one set is shown, it will be understood that the opposite end of the car will be equipped with like devices. In carrying out these results the switch-shifting rollers 16 16′ must be so arranged that they can be moved laterally a limited extent upon their supporting-shafts and so held and controlled that their beveled peripheries may bear against either side of the switch to open or close the same, and with this object in view I mount the hollow arms 13 13′ upon the shafts 10 10′ in such a way that while conforming to the rocking motions of their shafts they may be slid thereupon laterally to carry them to the desired side of the switch. For accomplishing this result each shaft 10 and 10′ in the construction illustrated is provided with a spline $10^{\times}$, and the arms are grooved to receive said splines. For shifting the roller-carrying arms I preferably employ levers 38 38′, pivoted at 39 to the car-platform and each connected at its lower end to the arm in any desired manner, as shown in Fig. 5. Each of these levers is provided with a suitable hand-grasp, and, as is obvious, by rocking the lever the arm may be slid along the shaft to bring the roller to the desired position. Each lever may work over a usual quadrant 45, (see Fig. 5,) to which it may be secured in any desired way to lock the lever and arm in its shifted position.

To prevent undue jar or concussion, the springs 14 14′ are employed, and they permit a slight yielding movement of the roller when it comes into contact with the switch and avoid breakage of the parts.

In operation my improved switch-shifting mechanism works as follows: Should a car be approaching a side track or turn-out when going in either direction, the motorman by placing his foot upon one of the plungers 34 or 36 will actuate the connecting-rod 30 or 35, as the case may be, and through the shaft 27 or 27′ and its arm 29 or 29′ will depress the plunger 22, for example, against the action of its spring, bringing the nose or point of said plunger to such position that as the car advances said nose or point will come into contact with one of the stops 37, the result being that the sheath 21 is swung upon its axis and the rod 17 is shifted to throw down one of the arms 13, so that the conical or beveled roller 16 on the end of said arm will wedge itself between the pivoted switch and the side rail of the track and will throw the switch, if desired, to the open position. Should a switch be open, one of the levers 38 38′ is grasped by the motorman, who turns said lever upon its pivot 39 and slides the arm carrying the roller to the position necessary to throw said roller against the inner side of the switch for the purpose of closing the same; but a very limited movement is required for accomplishing this result, and, as illustrated in Fig. 5, the arms are splined to their shafts or otherwise so connected thereto that they may move along the same.

From the above description it will be seen that by providing the car with duplicate sets of switch-operating mechanisms the pivoted tongues or switches may be absolutely controlled by the motorman and that, too, whether the car be proceeding in one direction or in another direction or whether it be desired to open or to close the switch. When the nose or point 23^{3} comes into contact with the stop 37 of the track, a slight jar will be felt which

will indicate to the motorman that the switch-shifting roller is in proper position to accomplish its work.

Many changes may be made in the constructional details of my invention, and it is not limited to the precise devices illustrated and described. In some instances on single-track lines a single switch-shifting roller and its actuating mechanism and a single means for throwing down the plunger 22 in its sheath may be employed, and the invention is not limited to the plurality of devices illustrated and described.

Having thus described the invention, what I claim is—

1. The combination, with a railway-car, of movable switch-shifting mechanism; a movable device carried by the car; a stop in the railway-track with which said device is adapted to engage; means operative by the motorman for shifting said movable device in a vertical plane, thereby to move it into position to engage said stop; and means for connecting said movable device with the switch-shifting mechanism.

2. In railway-switch-shifting mechanism, the combination, with a car, of a movably-mounted, switch-shifting device carried by the car; a railway-track having a switch; a stop in said track; a movable device carried by the car; means under the control of the motorman for actuating said device in a vertical plane so that it will engage with the stop; means connecting said device with the switch-shifting device, and means for moving said shifting device laterally.

3. In railway-switch-shifting mechanism, the combination, with a car, of a movably-mounted, switch-shifting roller carried by the car; a railway-track having a switch; a stop in the track; a movable device carried by the car; means under the control of the motorman for actuating said device in a vertical plane so that it will engage with the stop; and means controlled by said movable device for actuating the switch-shifting roller.

4. In railway-switch-shifting mechanism, the combination, with a car, of a movably-mounted, switch-shifting roller carried by the car; a railway-track having a switch; a stop in said track; a movably-mounted sheath carried by the car; a reciprocatory device within said sheath; means controlled by the motorman for depressing said reciprocatory device so that it will engage with the stop; and mechanism connecting the sheath with the switch-shifting roller.

5. In railway-switch-shifting mechanism, the combination, with a car, of a rocking, switch-shifting roller; a railway-track having a switch; a stop in said track; a rock-shaft; a sheath carried by said rock-shaft; a reciprocatory plunger within the sheath; means controlled by the motorman for depressing said plunger to have the same engage the stop; and connections between the rock-shaft and the switch-shifting roller, whereby when the plunger is actuated by said stop the roller will be thrown into operation to shift the switch.

6. In railway-switch-shifting mechanism, the combination, with a car, of a rocking arm; a switch-shifting roller having a conical periphery journaled on said arm; a sheath pivoted to the car; a reciprocatory plunger within said sheath; a railway-track having a switch; a stop in said track; means controlled by the motorman for depressing the plunger carried by the sheath so that it will engage with the stop in the track; and means connecting said sheath with the arm carrying the switch-shifting roller.

7. The combination, with a railway-track having a switch, and with a stop in said track, of a railway-car; a switch-shifting roller movably mounted on the car; a sheath also movably mounted on the car; a plunger within said sheath; means for depressing the plunger to cause its point to engage with the stop in the track; and means connecting the sheath with the switch-shifting roller.

8. The combination, with a railway-track having a switch, and with a stop in said track, of a car; a switch-shifting roller movably mounted on a platform of a car; a sheath also movably mounted on said platform; a plunger within said sheath; means controlled by the motorman for actuating said plunger to cause it to engage the stop; and connections between the sheath and the switch-actuating roller.

9. The combination, with a railway-track having a switch, of a stop in said track; rock-shafts journaled on a platform of the car; a switch-shifting roller carried by one of said rock-shafts; a sheath carried by the other rock-shaft; a plunger within the sheath; means controlled by the motorman for actuating said plunger; and connections between the rock-shaft carrying the sheath and the rock-shaft for controlling the action of the switch-shifting roller.

10. In railway-switch-shifting mechanism, the combination, with a car, of a rock-shaft; an arm secured to said rock-shaft; a switch-shifting roller journaled to the arm; a railway-track having a switch; a stop in said track; a second rock-shaft; a sheath carried by said second rock-shaft; a reciprocatory plunger within the sheath; means controlled by the motorman for depressing said plunger; and connections between the second rock-shaft and the rock-shaft for actuating the switch-shifting roller.

11. In switch-shifting mechanism, the combination, with a railway-track having a switch, of a car; a rocking lever secured to the car; a switch-shifting roller journaled on said lever; means for normally raising the lever and thereby the roller above the level of the track; a stop in the track; a device pivoted to the car; a plunger having a rectangular portion movable on said device; means under the control of the motorman for depressing said plun-

ger; means for returning said plunger to its normal position; and means connecting the device carrying the plunger with the switch-shifting roller.

12. In switch-shifting mechanism, the combination, with a railway-track having a pivoted switch, of a car; an arm mounted for swinging movement on said car; a switch-shifting roller journaled on the arm; a connecting-rod for actuating said arm; a lever to which the connecting-rod is pivoted; a device pivoted to the car; a rod connecting said device and said lever; a plunger movable on said device; means under the control of the motorman for actuating said plunger; and means for returning the plunger to its normal position.

13. In switch-shifting mechanism, the combination, with an arm pivoted to the car-body, of a switch-shifting roller having a conical periphery journaled on said arm; a connecting-rod for actuating the arm; a sheath pivoted to the car and articulated to said connecting-rod; a plunger mounted for reciprocatory movement in said sheath; an arm for depressing said plunger; a spring for returning said plunger to its normal position; a connecting-rod for actuating the arm; a rock-shaft journaled to the platform of the car; and a plunger for depressing said rock-shaft.

14. In a railway-switch-shifting mechanism, the combination, with a car, of a track having a switch; a device carried by the car for shifting said switch; means for actuating said switch-shifting device, said means involving a yielding connection; and means actuated by the motorman for actuating said means in a vertical plane.

15. The combination, with a car, of a rock-shaft having a hollow arm; a spring within said arm; a stem carrying a switch-shifting roller fitted within the arm; and mechanism under the control of the motorman for actuating said arm to throw the roller into contact with the switch.

16. In switch-shifting mechanism, the combination, with means for actuating the switch, of a railway-track; a stop in said track; a rock-shaft carried by the car; a slotted sheath; a spring-actuated plunger within said sheath and having its end in position to engage said stop; an arm entering the slot of the sheath; and means under the control of the motorman for actuating said arm.

17. The combination, with a car, of a railway-track; a switch in said track; means carried by the car for actuating said switch; a slotted sheath pivoted to the car-body; a plunger within the sheath, said plunger having a nose or point adapted to come into contact with a stop in the track when the plunger is depressed; means under the control of the motorman for depressing said plunger; and mechanism for connecting the sheath with the switch-shifting device.

GEORGE W. FERNSIDE.

Witnesses:
FRANK G. CAMPBELL,
WM. H. BLODGETT.