(No Model.) 2 Sheets—Sheet 1.

C. E. HARRIS.

SWITCH OPERATING MECHANISM.

No. 589,655. Patented Sept. 7, 1897.

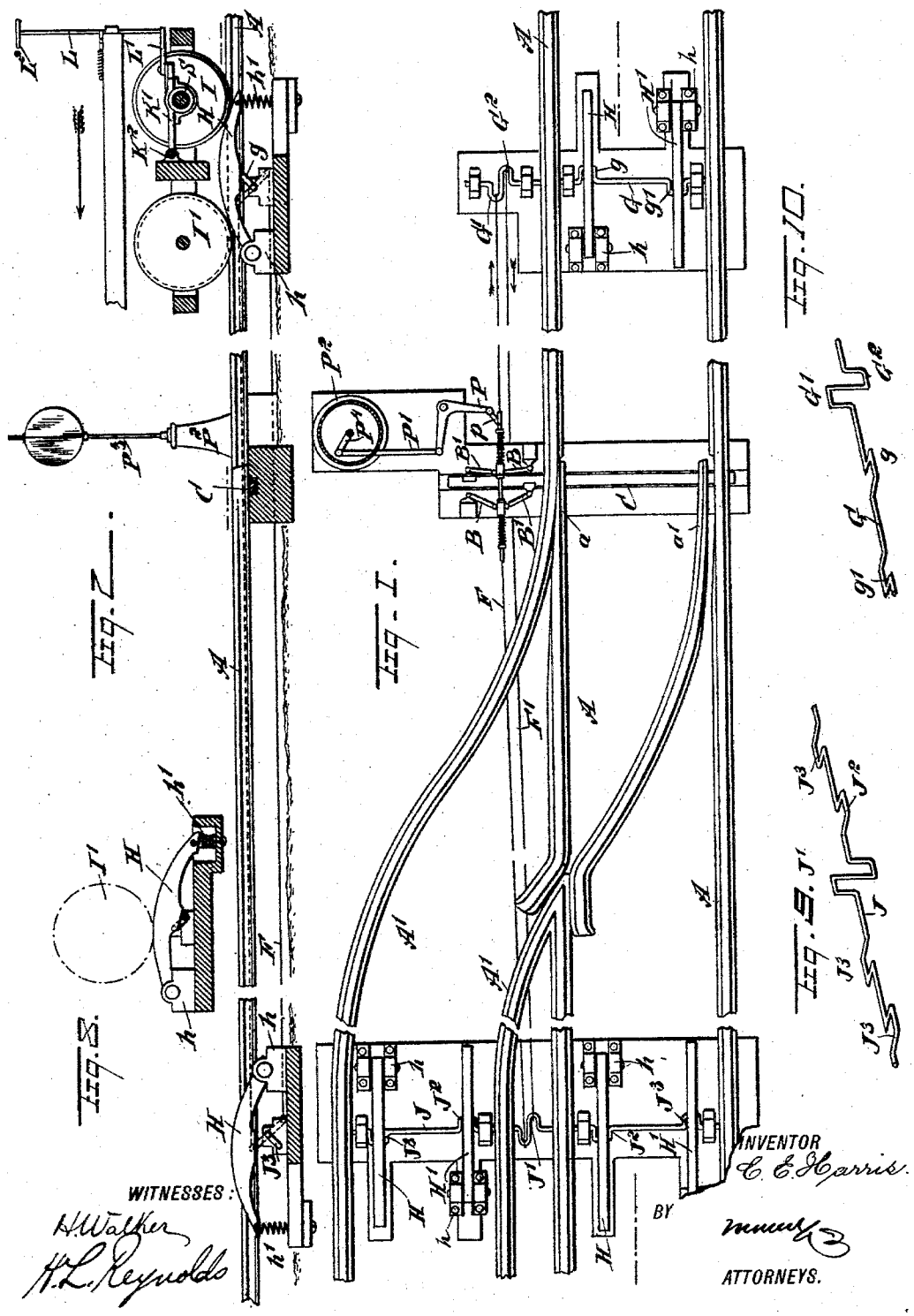


Fig. 2.

Fig. 1.

Fig. 10.

Fig. 5.

Fig. 8.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

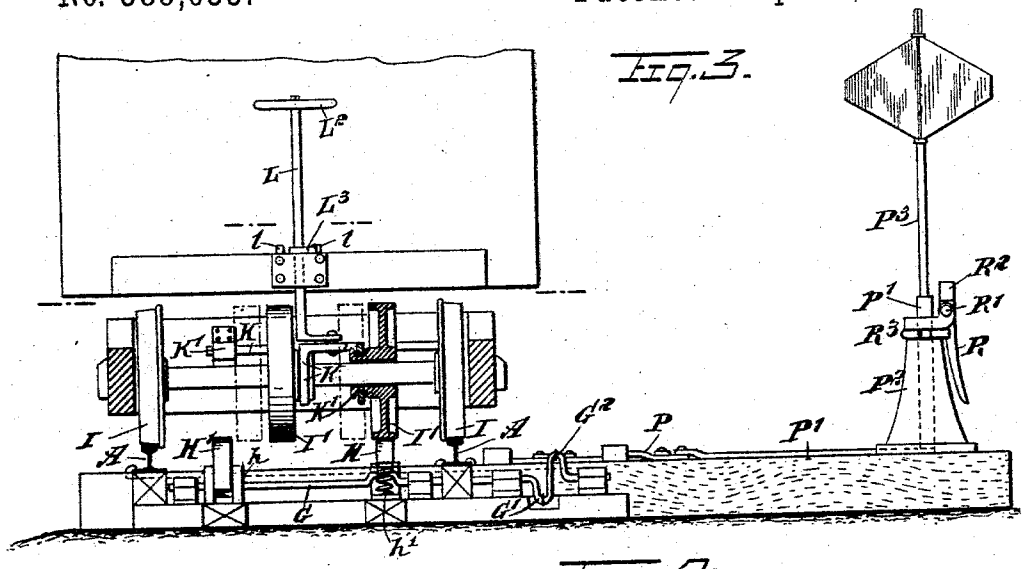


Fig. 4.

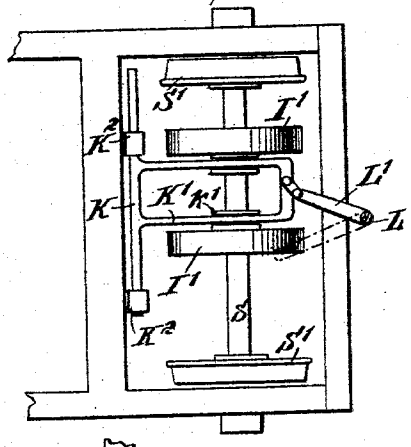


Fig. 6.

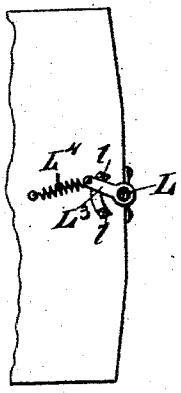


Fig. 7

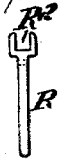
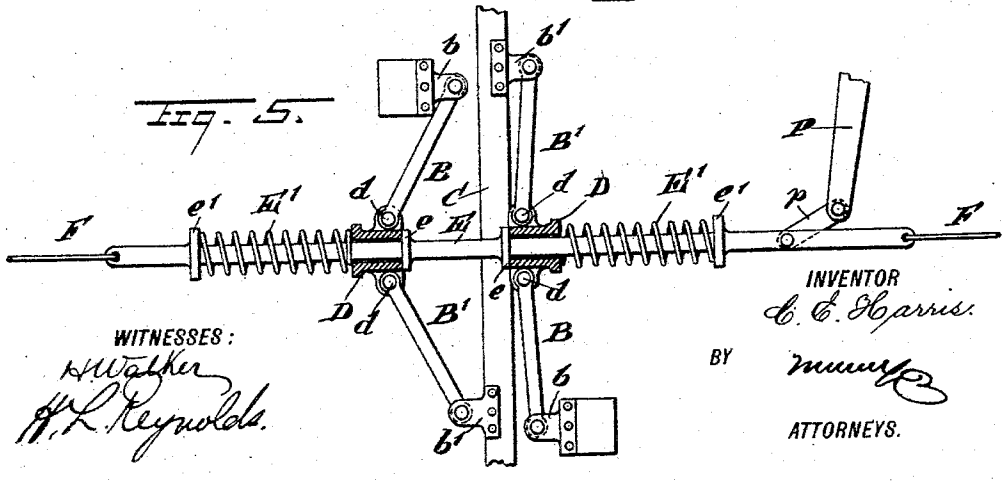


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES E. HARRIS, OF ELLWOOD CITY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILBUR J. HARRIS, OF MOUNT PLEASANT, OHIO.

SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 589,655, dated September 7, 1897.

Application filed December 26, 1896. Serial No. 617,039. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HARRIS, of Ellwood city, in the county of Lawrence and State of Pennsylvania, have invented a new and Improved Switch-Operating Mechanism, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of switch-operating mechanism which may be controlled from the car.

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

Figure 1 is a plan view of my device. Fig. 2 is a longitudinal elevation with portions of the car in section. Fig. 3 is an end view and partial section of my device with a car on the track. Fig. 4 is a top plan view of the car frame and axle, showing the actuating-wheels and their shifting mechanism. Fig. 5 is a detail plan view and partial section of the toggle-joint switch-throwing mechanism. Fig. 6 is a plan view showing the stops limiting the amount of the throw of the operating-lever. Fig. 7 is a plan view of the handle by which the switch may be operated by hand from the ground. Fig. 8 is a side elevation and section of one of the levers actuated by the wheel upon the car, and Figs. 9 and 10 are perspectives of the shafts extending across the track and operated by the lever shown in Fig. 8.

My invention consists, essentially, of a toggle-joint mechanism connected to the cross-bar which throws the movable portions of the track and mechanism for operating them, which consists of crank-shafts extending across the track and operated upon by pivoted levers which extend lengthwise the rails, said levers being depressed by being engaged by wheels mounted upon the car-axle, so that they may be shifted laterally to engage the proper lever or to clear all the levers.

The rails of the main line are represented by A and of the switch or turn-out by A'. The points of the switch or the movable portions of the rail are represented by a and a', respectively. These are both connected to the cross-bar C. This cross-bar extends outside the rails and is engaged by the toggle-joint mechanism for shifting the same. The bars B and B' forming the toggle-joint are arranged in two pairs. The bars B are pivoted at b to a fixed pivot and the bars B' at b' to the cross-bar C. The inner ends of the bars are pivoted at d to a collar D, sliding upon a bar E, which lies parallel with the rails. The fixed pivots b for each pair of levers are oppositely placed, one being toward the rail and the other at the opposite end of the toggle-joint, so that one toggle is used to throw the bar in one direction and the other in the opposite direction.

The bar E is connected by wires or other suitable connections F F' with the crank-shafts G and J upon each side of the switch. The bar E has fixed collars e and e'. Between the sliding collar D and the outer fixed collar e' is placed a spiral spring E'. This makes the connection to the toggle-joint a yielding one, which is essential, as the motion of the one toggle does not correspond exactly with the motion of the opposite one, being at one point faster and at another slower.

The shafts G and J extending across the rails are placed below the same and are pivoted in suitable supports, so that they may oscillate. The rods or wires F and F' connecting the bar E and shafts G and J may be made of any length found desirable and are connected to cranks G' G^2 J', placed exactly opposite upon the shafts G and J. The shaft G, which is made to extend across the main line only, has two cranks g and g' between the rails. Levers H and H' are pivoted in supports h and rest upon the cranks g and g', and the outer ends of these levers are supported in addition by the springs h'. The pivots of these levers are on the side of the shaft opposite the crank in order to assure of an equal throw for the same depression of the lever. The springs h' are also connected to the levers and to their support to prevent the lever from rising too far. The levers should be supported either by the crank or spring in such a position that they will engage the upper surface of the cranks g and g' when the same are at an angle of about forty-five degrees with the horizontal, as shown in Fig. 2. The two cranks g and g' are placed exactly opposite each other and at right angles with the cranks G' and G^2. The shaft J, which

extends across the main line and the switch, is made longer correspondingly and is similarly provided with two cranks J^2 and J^3 between the rails of the main line and of the switch; otherwise it is just the same as the shaft G. Levers H and H′ bear upon the cranks J^2 and J^3, respectively, of the shaft J. In case more than one side track is to be controlled from one switch the shaft J will be made long enough to reach across all the tracks.

Mounted upon one of the axles S of the car are wheels I, capable of sliding on the axle. These wheels are provided with grooved hubs k', engaged by the arms K′ of a yoke K, which slides in bearings K^2, mounted upon the truck. The yoke K′ is connected by means of an arm L′ to a shaft L, which extends upward at one end of the car to a convenient point for operation, and is provided with a hand-wheel L^2 or other suitable means for operating the same. This shaft L is also provided with an arm L^3, which moves between stops l, limiting the oscillation of the shaft and the throw of the arm L′.

A spring L^4 is attached to the end of the arm L^3 and tends to throw the same back to the central position at all times. In this central position the wheels I′ are in the position shown by dotted lines in Fig. 3, where they will clear both of the levers H and H′. In this, which is the normal position of the wheels I′, the car will not disturb the switch. If the lever L′ is thrown to one side, it will shift the wheels I′, as shown by full lines in Fig. 3, until they engage one of the levers H or H′ and throw the switch in a corresponding direction. If the wheels are shifted in the opposite direction, the other lever will be engaged and the switch oppositely thrown. The depression of the lever H by the passage of the wheels I′ over the same will depress the crank g and oscillate the shaft G. This will, through the rods F and F′, throw the toggle-joints B and B′ in such directions as to move the points of the switch. These levers being placed upon each side of the switch and between the rails of both main lines and the side track the switch may be operated in this manner by cars coming from either direction and upon any of the tracks. It is thus unnecessary to get off the car in order to throw the switch, and each switch may also be left in whatever position is convenient. The switches may be thrown to the position desired by the engineer when approaching them.

A link p is connected to the bar E and to a bell-crank lever P. This latter has a fixed pivot and is connected by a link P′ with a crank P^4 on the bottom of a switch-stand shaft P^3. This is supported upon a stand P^2, and at its upper end has a square portion p', which may be engaged by the square notch R^2 in the end of the lever R, which is pivoted at R′ to the upper end of the stand. Normally this will hang down in the position shown in Fig. 3, entirely disengaged from the shaft P^3. When it is desired to throw the switch by hand, the lever R is thrown over until its jaws engage the square portion p' upon the shaft, when the same may be turned. The ring R^3, to which the lever R is pivoted, is free to turn about the shaft P^3.

With my device it will be possible to switch cars upon any line desired without having a special switchman, as the workman upon the car may shift the wheels I′ into the proper position for throwing the switch.

The collars D engage the bar C when the toggles are thrown to their extended position. The pivots of the toggles are so placed in reference to this that the toggles are thrown beyond the center, so that any tendency to move the cross-bar C will be effectually resisted thereby. The springs E′ also serve to prevent the levers from being buckled outward or away from the cross-bar C.

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

1. In a switch-throwing mechanism, the combination of a cross-bar connected to the movable portions of the rails, with two sets of toggle-joint levers connected by opposite ends with said cross-bar and by their other ends to fixed pivots, and a bar having a common yielding or spring connection with the centers of both sets of toggle-joint levers, substantially as described.

2. In a switch-throwing mechanism, the combination of a cross-bar connected to the movable portions of the rails, with two sets of toggle-joint levers connected by opposite ends with said cross-bar and by their other ends to fixed pivots, and an operating-bar attached to the center of said toggle-joints by a connection which is positive in one direction and yielding in the other, said connections being oppositely arranged upon opposite sets of levers, substantially as described.

3. In a switch-throwing mechanism, a cross-bar connected to the moving switch-points, two sets of toggle-joint levers lying side by side on opposite sides of the cross-bar and connected thereto by opposite ends, and attached by their other ends to fixed pivots, and a rod lying parallel with the rails and connected to the centers of both toggle-joints, substantially as described.

4. In a switch-throwing mechanism, a cross-bar connected to the moving switch-points, two sets of toggle-joint levers lying side by side on opposite sides of the cross-bar, and connected thereto by opposite ends and attached by their other ends to fixed pivots, and a rod lying parallel to the rails and connected to the centers of both toggle-joints by a connection which is positive in one direction and yielding in the other, said connections being oppositely arranged upon opposite sets of levers, substantially as described.

5. In a switch-throwing mechanism, a cross-bar attached to the moving switch-points, two sets of toggle-joint levers lying side by side

upon opposite sides of the cross-bar and connected thereto by opposite ends, and attached by their other ends to fixed pivots, and an operating-rod lying parallel to the rails and connected to the centers of both toggle-joints by a yielding or spring connection, substantially as described.

6. In a switch-throwing mechanism, the combination of a cross-bar connected to the movable portions of the rails, with two sets of toggle-joint levers connected by opposite ends with said cross-bar, and by their other ends to fixed pivots, a bar having a common yielding or spring connection with the centers of both sets of toggle-joint levers, a shaft extending across the track having cranked connection with the bar which operates the toggle-joint levers, levers extending lengthwise the track and adapted by their depression to oscillate the shaft, and means mounted upon the cars for depressing either one of said levers at will, substantially as described.

7. In a switch-throwing mechanism, the combination of a cross-bar connected to the movable portions of the rails, with two sets of toggle-joint levers connected by opposite ends with said cross-bar, and by their other ends to fixed pivots, a bar having a common yielding or spring connection with the centers of both sets of toggle-joint levers, a shaft extending across the track having cranked connection with the bar which operates the toggle-joint levers, levers extending lengthwise the track and adapted by their depression to oscillate the shaft, a wheel mounted upon the car-axle and adapted to engage and depress said levers, and means for shifting the lateral position of said wheel relative to the rails, substantially as described.

8. In a switch-throwing mechanism, a cross-bar connected to the switch-points, two sets of toggle-joint levers lying side by side on opposite sides of the cross-bar and connected thereto by opposite ends, and attached by their other ends to fixed pivots, an operating-rod lying parallel to the rail and connected to the centers of both toggle-joints, a shaft extending across the track having cranked connection with the bar which operates the toggle-joint levers, levers extending lengthwise the track and adapted by their depression to oscillate said shaft, and means mounted upon the cars for depressing either one of said levers at will, substantially as described.

9. In a switch-throwing mechanism, the combination of a cross-bar connected to the movable portions of the rails, with two sets of toggle-joint levers connected by opposite ends with said cross-bar and by their other ends to fixed pivots, a bar having a common yielding or spring connection with the centers of both sets of toggle-joint levers, levers which are pivoted between the rails and have convexly-curved upper surfaces sloping each way from the center and adapted by their depression to throw the switch, wheels pivoted beneath the cars adapted to engage and depress said levers, and means for laterally shifting said wheels, substantially as described.

10. In a switch-operating mechanism, the combination of a cross-bar connected to the movable parts of the rails, lever connections for reciprocating the same, and actuating mechanism therefor consisting of a cranked shaft extending across beneath the rails, pivoted levers lying lengthwise the track and engaging the cranks of said shaft, wheels pivoted beneath the car to engage said levers to depress them, a spring connected to each lever for raising the same, and means for laterally shifting said wheels, substantially as described.

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