

No. 619,124.

Patented Feb. 7, 1899.

E. BEHNEY.

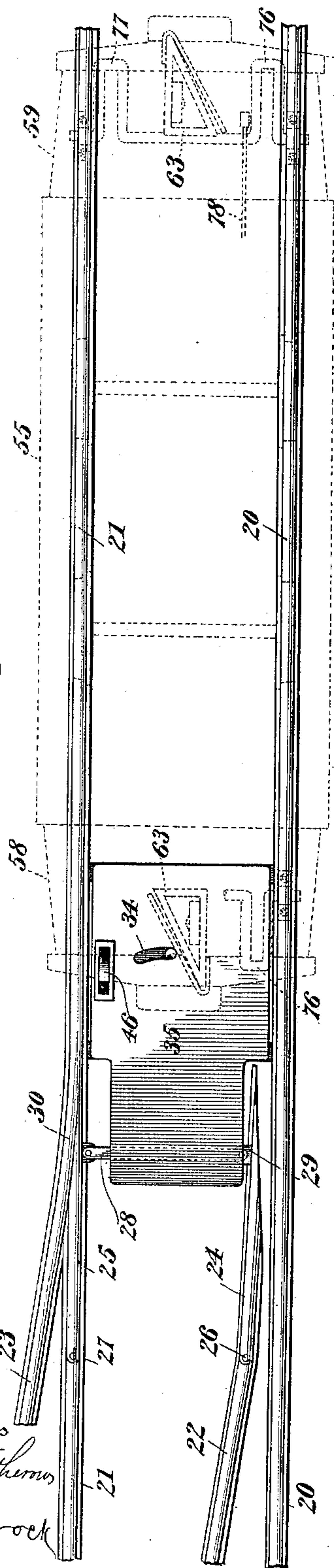
SWITCH OPERATING MECHANISM.

(Application filed June 2, 1898.)

(No Model.)

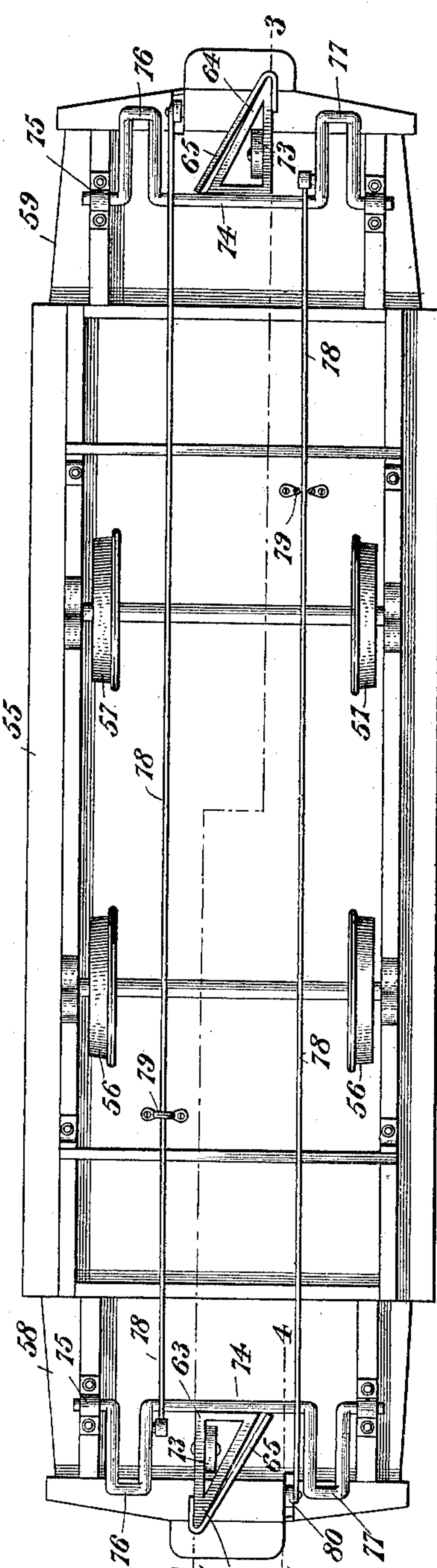
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Fig. 1.



Witnesses  
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Fig. 2.



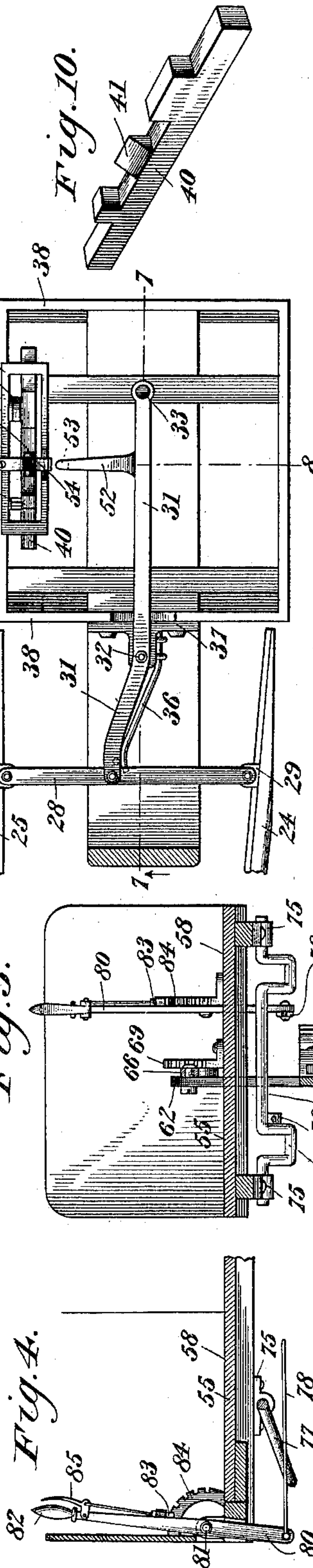
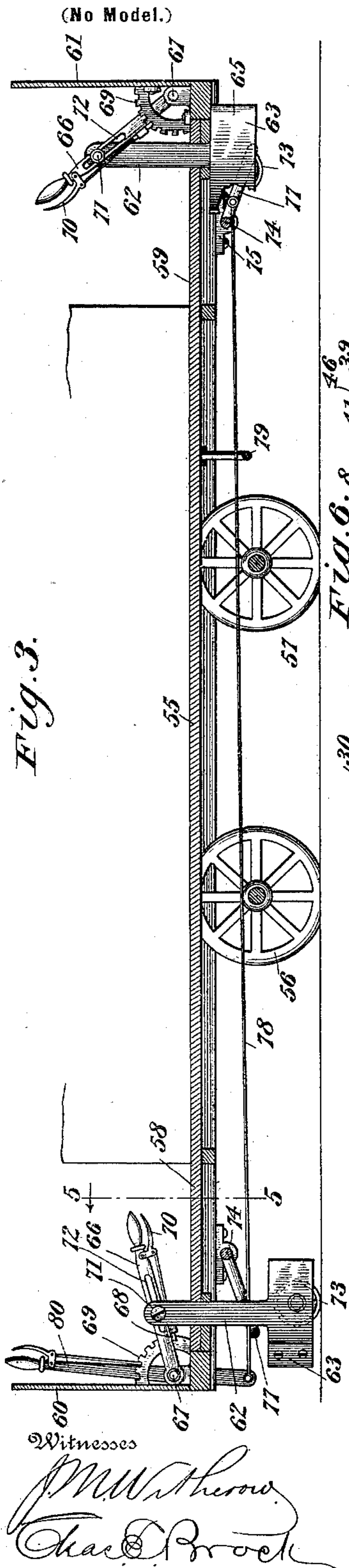
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SWITCH OPERATING MECHANISM.

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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

EPHRAIM BEHNEY, OF ELLWOOD, PENNSYLVANIA.

## SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 619,124, dated February 7, 1899.

Application filed June 2, 1898. Serial No. 682,350. (No model.)

*To all whom it may concern:*

Be it known that I, EPHRAIM BEHNEY, residing at Ellwood, in the county of Schuylkill and State of Pennsylvania, have invented a new and useful Switch-Operating Mechanism, of which the following is a specification.

My invention relates to mechanism for shifting the switches of railways, more particularly relating to devices to be attached to electric or other railway cars for operating certain mechanisms attached to the switch.

The object of the invention is to furnish improved means attached to and operated by the motorman of a passenger-car for bringing into play devices suspended below the car, whereby as the car approaches the switch said suspended devices will actuate mechanism attached to the switch to shift the switch-tongues and retain them in their shifted position until released by certain other mechanism after the wheels have passed upon the switch.

With this object in view my invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward specifically pointed out in the claims.

In order to enable others skilled in the art to which my invention most nearly appertains to make and use the same, I will now proceed to describe its construction and operation, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of a portion of a railway and switch equipped with the switch-shifting mechanism which forms part of my invention, the car and part of its operative mechanism being shown in dotted lines. Fig. 2 is a bottom plan view of a car, illustrating that portion of my invention which depends below the bottom of the car. Fig. 3 is a vertical longitudinal section taken on the plane indicated by the broken line 3 3 of Fig. 2. Fig. 4 is a detail sectional view on the line 4 4 of Fig. 2. Fig. 5 is a detail sectional view taken on the transverse plane indicated by the broken line 5 5 of Fig. 2. Fig. 6 is a top plan view of that portion of my switch-operating mechanism which is below ground, the protecting-cover being removed. Fig. 7 is a ver-

tical longitudinal sectional view on the broken line 7 7 of Fig. 6. Fig. 8 is a vertical transverse sectional view on the line 8 8 of Fig. 6. Fig. 9 is a detail sectional view on the line 9 9 of Fig. 8. Fig. 10 is a detail perspective view of the latch-bar of the releasing mechanism detached from its connected parts.

Like numerals of reference indicate the same parts wherever they occur throughout the various figures of the drawings.

Referring to the drawings by numerals, 20 and 21 indicate the main rails of the track, and 22 and 23 the switch-rails, switch-tongues 24 and 25 being pivoted at 26 and 27 and connected together by a cross-bar 28, pivotally connected to the switch-tongues at 29 and 30. A lever 31, pivoted at 32, is connected at one end pivotally to the cross-bar 28 and is provided at its opposite end with an upright pin 33, which projects above the surface, passing through a curved slot 34 in a protecting-cover 35, the lever and other switch-shifting mechanism connected with the track being situated in a depression or pit formed between the rails.

A spring 36, attached to a bracket 37, (to which the before-mentioned lever 31 is pivoted,) normally bears against one side of the lever 31 near its junction with the cross-rod 28, the tendency of the spring being to force the lever and the cross-rod laterally in a direction to normally hold the switch-tongue 24 away from the rail 20 and the switch-tongue 25 against the rail 23, thus maintaining a main line open and the switch closed.

All of the underground switch-shifting mechanism is mounted in a frame 38, to which the bracket 37 is attached and in which is secured a small frame 39, in which a latch-bolt 40 is mounted to slide longitudinally. The latch-bolt 40 is provided with a beveled catch 41 and is normally held with the beveled catch 41 opposite a notch 42 in the frame 39 by means of a vertical spring 43, rigidly secured at its lower end by a pin 44 to the side of the frame 39 and engaging near its upper end between two pins 45, projecting laterally from the latch-bolt. A lever 46 is pivotally secured at 47 to the side of the frame 39 and passes upward above the surface through a slot 48 in the protecting-cover 35. This lever



is connected to the latch-bolt 40 by a pin 50, which passes through a slot 51 in the lever and into the latch-bolt.

A catch-arm 52 projects laterally from the bar 31 near its rear end and in line with the beveled catch 41 of the latch-bolt and the notch 42 of the frame 39. When the lever 31 is moved laterally in the direction to throw the switch open, the catch-arm 52 passes over the latch-bar, riding over the beveled catch 41 until a hook 53 on its outer end engages over the edge of said catch, it being normally pressed downward to assure such engagement by spring 54, secured to the under side of the top of the frame. When the lever 46 is moved in either direction on its pivot 47, it will move the latch-bolt 40 longitudinally and will move the catch 41 laterally out of engagement with the hook 53 on the catch-arm 52 of the lever 31, thus releasing said lever and permitting the frame 36 to throw the lever into its normal position with the switch closed.

From the foregoing description it will be readily understood how the switch-tongue may be shifted by the movement of the pin 33 and lever 46, and I will now proceed to describe the construction of the mechanism attached to the car by means of which the lever and pin are actuated while the car is passing over them.

55 indicates the floor of a car; 56 and 57, the wheels; 58 and 59, the platform, and 60 and 61 the dashboard. 62 indicates a vertical bar mounted to slide through the platform. A triangular-shaped frame 63 is secured to the lower end of said bar, the side representing the altitude of the triangle lying in a longitudinal frame and that representing the base lying in a transverse plane, the third side 64, which represents the hypotenuse, forming a vertical but laterally-inclined surface in line with the pin 33. As the car moves forward this inclined plane may be brought into contact with the side of the pin 33 to move it laterally, the contact being cushioned by a spring 65, secured in front of the inclined surface 64.

66 indicates a hand-lever pivoted at 67 above the platform of the car and is provided with a pawl 68 to engage the notches of a rack 69 to hold the lever in any adjusted position, a lever 70 serving to release the pawl from engagement with the rack. This lever is connected to the upper end of the bar 62 by means of a screw 71, which passes through the sides of the bar and through its slot 72 in the lever 66. When the sliding bar 62 is depressed, a wheel 73, journaled in its lower end, will rest upon the ground.

74 indicates a cross-bar or rock-shaft journaled in brackets 75 and provided with cranked bends 76 and 77. A rod 78 is secured at one end to the cranked bend 77 and passes through a supporting-bracket 79 on the bottom of the car-floor, the rod being secured at the opposite end of the car to the lower end of a lever 80, pivoted at 81 above the plat-

form and provided with an operating-handle 82 at its upper end. A pawl 83, pivotally connected to the lever, engages the teeth of a curved rack 84, by means of which the lever may be retained in any adjustment, a trigger-lever 85 serving to release the pawl when it is desired to remove the lever.

As before stated, the normal position of the switch is closed, it being held in that position by the spring 36. When a car moving along the main track is to be turned into the switch, the motorman operates the lever 66 downward, depressing the sliding bars 62 and the triangular frame 63 until the wheel 73 rests upon the ground. The contact of the triangular frame or shoe 63 with the side of the pin 33, projecting through the slot 34 in the covering-plate 35, will move said pin laterally, carrying the long end of the lever 31 with it, moving the outer end of the lever in the opposite direction against the action of the spring 36 and through the medium of the cross-bar 38 shifting the switch-tongues 24 and 25 laterally and opening the switch. The motorman will now raise the lever 66, the switch being retained in its open position by the engagement of the hook 53 of the latch-arm 52 with the beveled catch 41 of the latch-bolt 40. The motorman will now lower the lever 80, which will cause its lower end to draw upon the rod 78, oscillating the rock-shaft 74 and bringing the cranked bend 77 into a vertical position. This cranked bend being in the rear of the wheels of the car and in line with the lever 46, projecting through the slot 48 in the covering-plate 35, will come in contact with that lever after the wheels of the car have all passed onto the switch-rail. This contact of the cranked bend 77 with the lever 46 will move said lever on its pivot and slide the latch-bolt longitudinally a sufficient distance to cause the catch 41 to pass out of engagement with the hook 53 of the catch-arm 52, thus releasing the lever 31, which will be immediately thrown back into its normal position by the spring 36, again closing the switch.

The mechanisms described for operating the switch are duplicated at the opposite ends of the car, so that the car mechanism will be equally operated no matter which end is approaching the switch. The switch will be maintained normally closed, so that no action is necessary on the part of the motorman unless he desires to run the car upon the switch, in which case the depression of the lever 66 will bring the triangular shoe 63 in position to throw the switch open, and the latch-arm 52 by engaging with the latch 41 will hold it open and permit him to raise the shoe at once to prevent it from coming into contact with the main rail while passing upon the switch. At any time before the car has passed entirely onto the switch he may depress the lever 80, which will bring the cranked bend 77 of the rock-shaft 74 into position to move the lever 46 and release the



latch-arm 62 to permit the switch-tongues to be returned by the spring 36 to their normal closed position.

From the foregoing it will be seen that I have provided easily-operated mechanism for carrying out the objects of my invention, and while I have illustrated and described the best means now known to me for carrying out my invention I do not wish to be understood as restricting myself to the exact details of construction shown and described, but hold that any slight changes or variations, such as might suggest themselves to the ordinary mechanic, would properly fall within the limit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with the switch-tongues, of the cross-rod pivotally connecting them, the lever pivoted to the frame and pivotally connected at one end to the cross-rod, the pin projecting upward from the opposite end of the lever through a slot in the cover-plate, the spring for normally holding the lever in position to close the switch, the catch-arm projecting laterally from the lever and provided with a hook at its outer end, the latch-bolt provided with a beveled catch to engage said hook, and means for moving the latch-bolt longitudinally to disengage the catch from the hook and release the lever, substantially as described.

2. The combination with the switch-tongues, of the cross-rod pivotally connecting them the lever pivoted to the frame and pivotally connected at one end to the cross-rod, the pin projecting upward from the opposite end of the lever through a slot in the cover-plate, the spring for normally holding the lever in

position to close the switch, the catch-arm projecting laterally from the lever, the latch-bolt provided with a beveled catch to engage said hook, the spring for maintaining the engagement of the latch-arm and catch, the slotted lever pivoted at its lower end and having its upper end projecting above the surface through a slot in the surface of the cover-plate, and the pin passing through the slot in the lever and into the latch-bolt, substantially as described.

3. The combination with the car, of the vertical plate slidably mounted through the platform, the triangular frame or shoe attached to its lower end, the spring-contact plate secured to said shoe, and the wheel journaled in the shoe, substantially as described.

4. The combination with the car, of the vertical plate slidably mounted through the platform, the triangular frame or shoe attached to its lower end, the slotted hand-lever pivoted above the platform, the pin passing through the vertical plate and the slot in the lever, the curved rack, and the pawl mechanism attached to the lever and engaging the rack, substantially as described.

5. The combination with the car, of a rock-shaft pivoted below the platform at one end and provided with a cranked bend, a lever pivoted above the platform at the opposite end of the car and projecting below it, a rod connecting the lower end of the lever with the cranked bend, the curved rack, and the pawl-and-lever mechanism for engaging said rack, substantially as described.

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