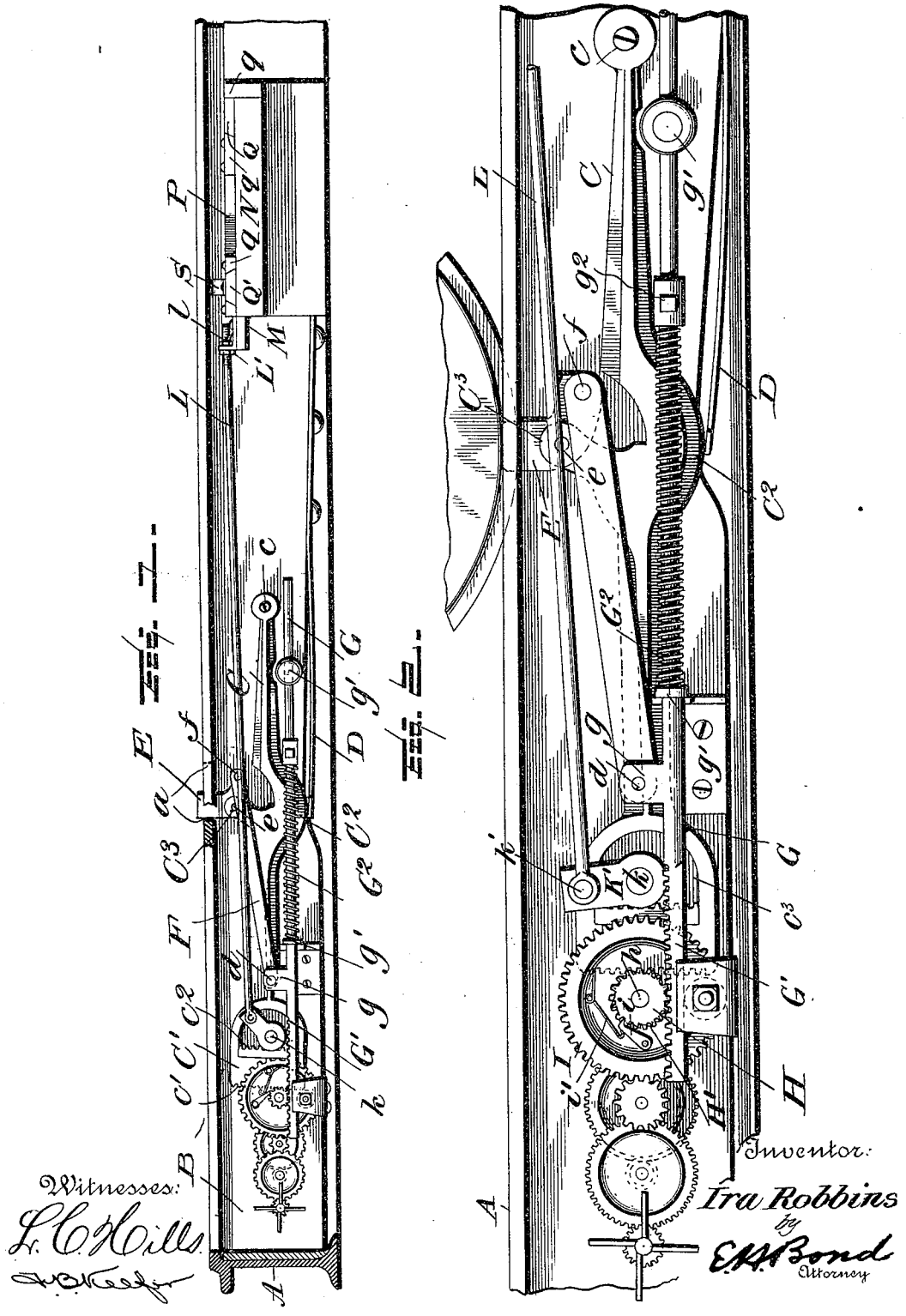
No. 646,039. Patented Mar. 27, 1900.

I. ROBBINS.

RAILWAY SWITCH.

(Application filed Aug. 3, 1899.)

(No Model.) 3 Sheets—Sheet 1.



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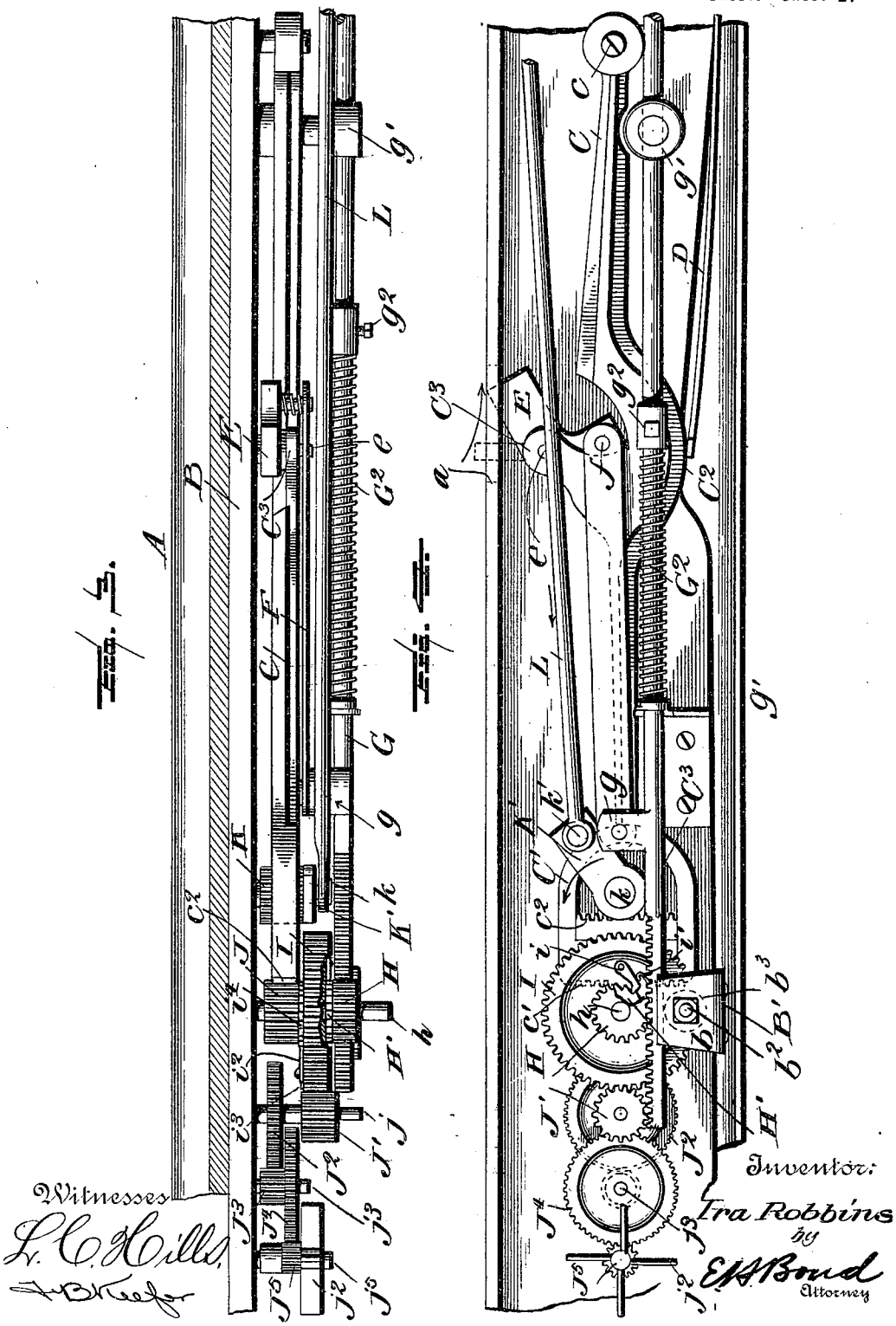
(No Model.) (Application filed Aug. 3, 1899.) 3 Sheets—Sheet 2.



Witnesses
L. C. Hills.
[illegible]

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(No Model.) 3 Sheets—Sheet 3.

Fig. 5.

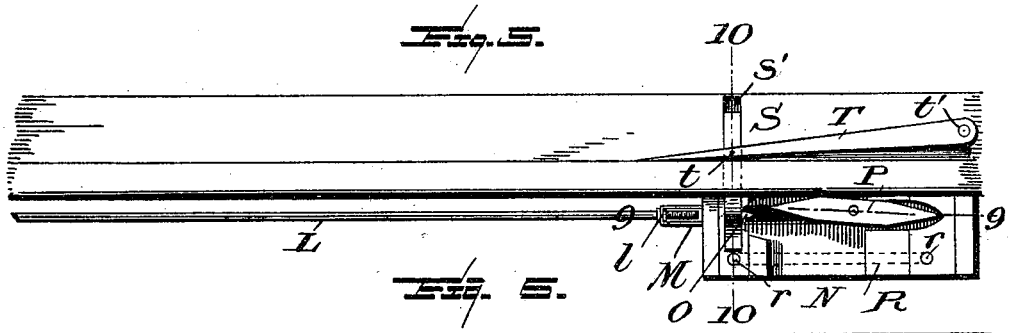


Fig. 6.

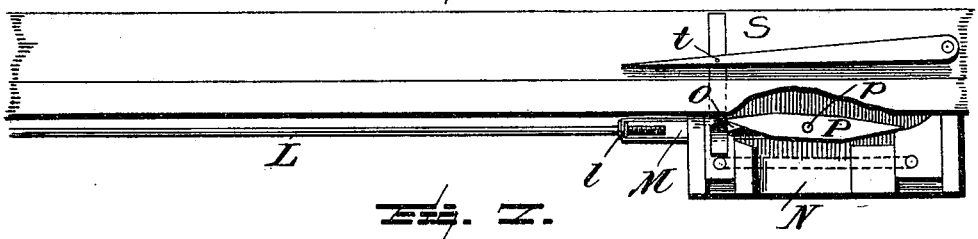


Fig. 7.

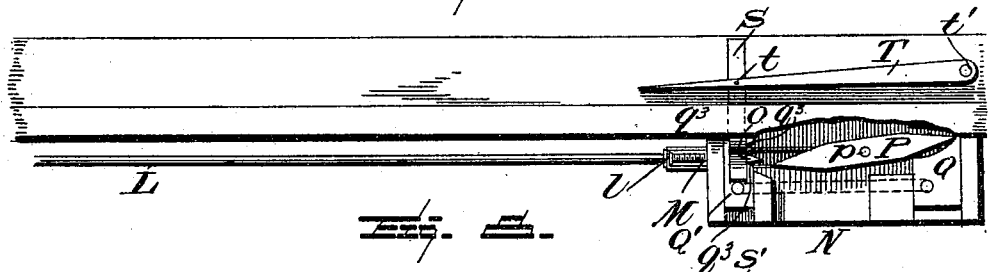


Fig. 8.

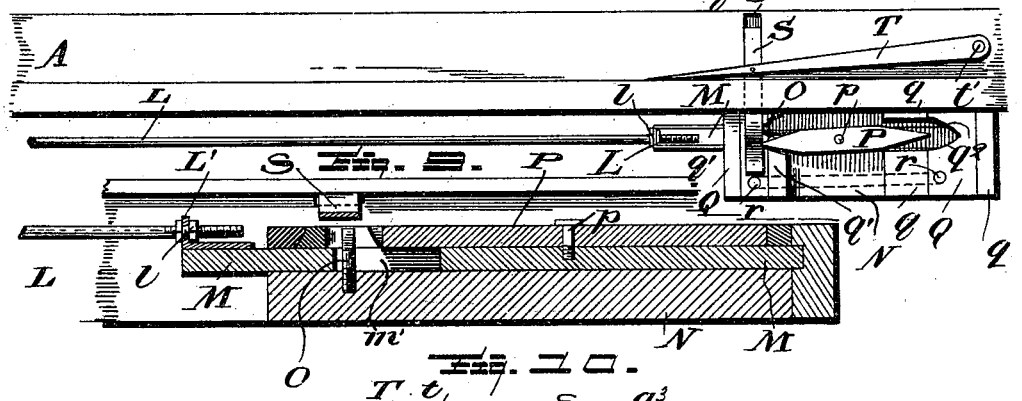
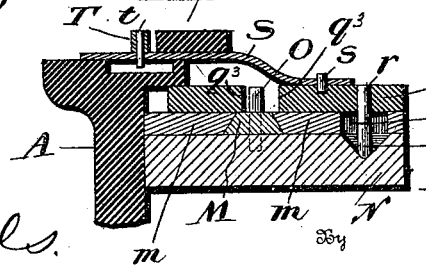


Fig. 9.

Fig. 10.



Witnesses

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UNITED STATES PATENT OFFICE.

IRA ROBBINS, OF CAMDEN, NEW JERSEY.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 646,039, dated March 27, 1900.

Application filed August 3, 1899. Serial No. 725,969. (No model.)

To all whom it may concern:

Be it known that I, IRA ROBBINS, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Railway-Switches; and I do hereby 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 certain new and useful improvements in railway-switches of that class in which the switch is thrown by the wheel or wheels of a moving train by the engagement of the wheel with a movable part, such as a pin or arm extending upward through an opening in the rail or by the side of the said rail; and it has for its object, among others, to provide an improved form of mechanism of this character that shall be simple, durable, not liable to get out of order or injured, and positive and reliable in its action.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is capable of embodiment in a variety of forms, some of which are illustrated in the accompanying drawings, which illustrate what I at the present time consider as the preferable way of carrying out the invention.

In the said drawings, Figure 1 is a side elevation showing the mechanism in its normal position. Fig. 2 is an elevation, on an enlarged scale, showing the position the parts assume when the rock-arm is depressed by the wheel of a passing train. Fig. 3 is a top plan of Fig. 2 with a portion of the rail in section. Fig. 4 is a view similar to Fig. 2, showing the rock-arm pushed forward manually and the other parts in the position they assume at such times. Fig. 5 is a plan of the switch end, showing the arm that moves the switch in one of its positions. Fig. 6 is a similar view with a portion of the rail broken away and showing the arm in a different position. Fig. 7 is a view similar to Fig. 6 with the arm in still a different position. Fig. 8 is a like view showing yet another position of the said arm. Fig. 9 is a vertical section on the line 9 9 of Fig. 5. Fig. 10 is a section at right angles to Fig. 9, being taken on the line 10 10 of Fig. 5.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates a rail of any of the well-known or preferred forms of construction. In the tread thereof is provided an opening *a*, through which may work the rock-arm or the pin, whichever is employed, as will be hereinafter described. Attached to the web of the rail is a plate or bar B, which carries a portion of the mechanism now to be described. C is an arm pivotally attached at one end to said plate, as at *c*, and at its other end terminating in or provided with a vertically-broadened portion C′, the other end of which is provided upon the one side with a rack *c′* and upon the opposite side with a similar rack c^2, as seen clearly in Figs. 1, 2, and 4. These racks operate in conjunction with pinions, soon to be described. Between its ends this arm is provided with the downwardly-extending portion C^2, upon the under side of which bears a strong flat spring D, although it is evident that other forms of spring may be employed, the said spring being attached to the plate B, as seen clearly in Fig. 1. Its function is to assist in the return of the arm to its uppermost position, as will be apparent as the description proceeds. Rising from the upper face of this arm, between its ends, and in this instance shown as substantially in line with the thickened portion, is the extension C^3, in which is supported a pin *e*, on which is pivotally mounted the rock-arm E, the substantially vertical portion of which works through the hole *a* in the tread of the rail and normally projects above the upper edge thereof, as seen in Fig. 1. The free end of the substantially-horizontal portion of the rock-arm is pivotally connected, as at *f*, with one end of the link F, which is disposed substantially horizontally, and its other end is pivotally connected, as at *d*, with a lug *g*, rising from the rod G, which is mounted to slide horizontally, being guided near each end in suitable guides *g′* on the plate B. One end of this rod is provided with the rack

G′, which is adapted to mesh with the pinion H, which is loose upon a stub-shaft *h*, supported from the plate B.

G^2 is a spring around the rod G, one end being adjustably held on the rod, as by the collar and set-screw shown at g^2; but it is evident that other means for this purpose may be employed. The other end of the spring finds a resistance against the guide *g′* or a collar thereon, as seen in Figs. 1, 2, 3, and 4.

H′ is a ratchet-wheel movable with the gear or pinion H, and also loose upon the same shaft *h* is the larger pinion I, upon the outer face of which is pivotally mounted a pawl *i*, forced gently to its work by a spring *i′*, while upon the opposite face of this pinion I is another pawl i^2, backed by a spring i^3, the said pawl being disposed oppositely to the one upon the other face of the pinion and adapted to engage the ratchet-wheel i^4, fast with the pinion J, which is also loose upon the shaft *h*. This latter pinion is designed to be engaged by the rack *c′*, as seen best in Fig. 3. The pinion I is designed to be connected with some retarding mechanism, such as a compressed-air device, a motor, or, for instance, such a contrivance as is illustrated in the drawings, in which J′ is a pinion loose upon a stub-shaft *j* and meshing with the pinion I, while fast so as to move with the pinion J′ is a pinion J^2, which is adapted to mesh with the small pinion J^3 on a stub-shaft j^3, and movable with this pinion J^3 is a large pinion J^4, which in turn meshes with a small pinion J^5 on a stub-shaft j^5 and which carries a fly-wheel or a fan-wheel, as seen at j^2 in Figs. 1, 2, 3, and 4. The object of this retarding mechanism will be explained later on.

The rack G′ is guided in its movements and is kept from lateral movement by means of an upwardly-extending portion *b* of the bracket B′, attached to the plate B, and mounted on a horizontal shaft b^2 in this bracket is a shaft or roller b^3, upon which the lower face of the rack travels, as indicated in Figs. 2 and 4 by dotted lines, thus tending to decrease the friction.

On a shaft *k*, extending horizontally and supported from or by the plate B, is a gear K, that is designed to engage the rack c^2, the said gear being disposed within the opening c^3 of the enlarged portion C′, as seen in Figs. 1, 2, and 4. Fast so as to move with this pinion is the arm K′, to the free end of which is pivotally connected, as at *k′*, one end of the switch-shifting rod L. The other end of this rod is adjustably connected, as at *l*, with the vertical bracket L′, secured to the sliding plate M, which is mounted to slide in suitable guides *m m*, preferably undercut, as shown best in Fig. 10, so as to prevent displacement, and this slide is provided with the longitudinally-disposed vertical slot *m′*, (seen plainly in Fig. 9,) for a purpose which will soon be explained. These guides are supported on a lateral support N, supported in any suitable manner, and rising vertically therefrom is the pin O, the opposite faces of which are beveled, as shown clearly in Figs. 5, 6, 7, and 8, and this pin is disposed in the longitudinal slot *m′* of the slide M, as seen in Figs. 5 to 10, inclusive.

P is a double-pointed switch-lever pivotally mounted between its ends, as at *p*, on the slide M. This lever is designed to act in conjunction with the pin O and the cams now to be described to shift the switch. On the upper face of the support N are the transverse bars Q and Q′, mounted to slide in suitable guides *q* and *q′*, respectively, as seen in Figs. 5 to 8. The sliding bars Q and Q′ are connected by the opposite ends of the upright portions *r* of a substantially **U**-shaped rod or wire R, which extends down into the support N, as indicated in Figs. 5 to 8, resting in a depression therein, as seen best in Fig. 10, the said rod passing through slots m^4 in the guides *m*, as is shown also in said Fig. 10.

The inner edge or face of the sliding bar Q is provided with the double cam-surfaces q^2, as seen best in Fig. 8, while the adjacent face or edge of the sliding bar Q′ is provided with the inclined or beveled faces q^3, as seen clearly in Figs. 5 and 7.

The sliding bar Q′ has attached thereto, as at *s*, one end of the arm or bar S, the other end of which after passing through a suitable slot in the under side of the tread of the rail is mounted to slide in a suitable groove or guide *s′*, as seen clearly in Figs. 5 and 8, and has pivotally attached thereto, as at *t*, the point of the switch T, which is suitably pivoted at its other end, as at *t′*.

With the parts constructed and arranged substantially as above described the operation will be readily understood, and, briefly stated, is as follows: It being understood that the upper end of the rocking arm E is normally above the upper face of the tread of the rail, in the position seen in Fig. 1, when the front wheel of an approaching train comes along it presses this rock-arm squarely down and through the medium of the mechanism above described throws the switch. The depression of the rock-arm throws downward the rack end of the arm C, and this, by reason of the engagement of the rack c^2 with the pinion K, causes the arm K′ to move in the direction of the arrow shown in Fig. 4, thus drawing the rod L in the direction of the arrow thereon in said Fig. 4, thus pulling the slide M outward from the position in which it is shown in Fig. 5 to that which it is shown in Fig. 6. This movement of the slide causes the end of the switch-arm P to enter between the beveled side of the pin O and the adjacent inclined wall of the slide Q′ and force the latter in the direction indicated. This moves the arm S in its groove or guide, and consequently moves the switch T from the position in which it is seen in Fig. 5 to that shown in Fig. 6. Now the train having passed the train of gears returns the arm to its normal position. The train of gears, or whatever retarding mechanism is employed, serves to

prevent the rock-arm from returning till after all the wheels of one or more cars have passed over. The rock-arm is so mounted that it has, in addition to its direct vertical movement as above described, a movement in a curved path, as seen in Fig. 4, where it is shown as manually thrown down into such position that the wheel of an approaching train will not actuate it. This is so that in case the switch is set all right when a train approaches the switch the train may pass on without operating it. In order to accomplish this, it is proposed to place upon the under side of the engine or car a device that may be readily depressed, so as to be brought into contact with the tread of the rail and sweep the arm forward into the position in which it is shown in said Fig. 4, in which position the switch will not be moved and the car or cars may pass on. The train of gears or the retarding device serves its function under these circumstances as effectually as when the rock-arm is depressed, as before described, and prevents the return of the rock-arm till all of the cars have passed. As the switch-arm P is moved longitudinally by the movement of the slide M, to which it is attached, its end x is thrown to one side or the other of the beveled pin O to throw the switch in one direction or the other. The switch-arm is turned on its pivot, so as to come in position to throw the switch by reason of the engagement of its opposite end with the cam-surfaces q^2 of the slide Q, as will be readily understood from reference to Figs. 5 to 8, in which the switch-arm is shown in the various positions it is caused to assume as the switch is moved from one position to the other and then returned to the initial position.

In Fig. 4 I have illustrated how the mechanism may be actuated by means of a vertical pin working through a hole in the rail. In said Fig. 4 this pin U is indicated by dotted lines and is attached to the end of the vertical extension C^3 of the arm C. In this case the rock-arm is to be dispensed with. Then whenever a car comes along, if the switch is not in the right position, when the pin is pressed down it will throw the switch in the same manner as it was thrown by the vertical depression of the rock-arm; but if the switch is right to go ahead then the motorman has only to run the front wheels over the pin, which will depress it and throw the switch wrong for him. Then he must stop for, say, ten seconds, more or less, until the retarding device has allowed the mechanism to return and the pin to assume its former position. Then the car can go ahead and the hind wheels will throw the switch into the proper position. By this means any car can readily operate the switch to throw it in either direction desired.

It is to be understood that the rod L may be of any desired length, so that the rock-arm or the pin may be any required distance from the switch. The mechanism should be inclosed in dust-tight casings, so as to protect the same from the dust as well as the weather. No such casing is herein illustrated, as it is a common expedient and would interfere with the proper showing of the mechanism constituting the subject-matter of this invention.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. In a railway-switch, the combination of switch-moving devices, a depressible part operatively connected therewith, and a retarding mechanism for controlling the return movement of said part, as set forth.

2. In a railway-switch, the combination of switch-moving devices, a depressible part arranged to be depressed by the wheel of a car, a retarding mechanism, and connections between said depressible part and the switch-moving devices and also with the retarding mechanism, as set forth.

3. In a railway-switch, the combination of switch-moving devices, a depressible part operatively connected therewith, a retarding mechanism, operatively connected with the depressible part, and a connection between the retarding mechanism and the switch-moving devices as set forth.

4. In a railway-switch, a rock-arm mounted for vertical movement and also for movement in the arc of a circle, and a retarding mechanism arranged to coöperate with the rock-arm in either of its movements, as set forth.

5. In a railway-switch, a rock-arm mounted for vertical depression and also for pivotal movement, switch-moving devices operatively connected with said rock-arm, and a retarding mechanism for coöperation with the rock-arm whether it be depressed or moved on its pivot, as set forth.

6. In a railway-switch, a rock-arm mounted for vertical depression and also for pivotal movement, a switch-moving device arranged to be actuated by the depression of the rock-arm and inoperative when the rock-arm is moved on its pivot, as set forth.

7. In a railway-switch, a rock-arm mounted for vertical and pivotal movements, a switch-moving device mounted and connected to be actuated as the rock-arm is depressed, and inoperative as the rock-arm is moved on its pivot, and a retarding mechanism arranged to serve with the rock-arm in both of its movements to retard its return movement, as set forth.

8. In a railway-switch, a rock-arm mounted for vertical movement and also movable upon a pivot, a link connected with said rock-arm, a retarding mechanism operatively connected with said link, and a switch-moving mechanism, all substantially as specified.

9. In a railway-switch, a rock-arm mounted for pivotal and vertical movement, a link pivotally connected therewith, a lever to which said rock-arm is pivoted, a rack movable by said link, a retarding mechanism operatively

connected with said rack, and a switch-moving rod actuated by the movement of said lever, as set forth.

10. In a railway-switch, a depressible part, a lever operatively connected therewith, a switch-moving rod operatively connected with said lever, and a retarding device operatively connected with the depressible part, as set forth.

11. In a railway-switch, a depressible part, a lever upon which it is mounted, a retarding mechanism operatively connected with said lever, a switch-moving rod operatively connected with the lever, and means for actuating said rod and the retarding mechanism to move the switch and hold the depressible part against return movement, substantially as specified.

12. In a railway-switch, a depressible part, a pivoted lever on which it is mounted, a train of gears comprising a retarding device, racks carried by said lever for controlling said gears, a switch-moving rod and interposed devices embodying a pinion meshing with one of said racks, as and for the purpose specified.

13. In a railway-switch, the combination of a depressible part, a pivoted lever on which it is mounted, a sliding rod carrying a rack and actuated by the movement of said depressible part, a retarding mechanism actuated by said rack, and a switch-moving rod operatively connected with and actuated by the movement of said lever, substantially as specified.

14. In a railway-switch, the combination of a switch-moving device, a vertically-movable and pivotally-mounted part operatively connected therewith, a retarding mechanism, pivotal connection between the same and the said part, and a connection between the retarding mechanism and the switch-moving device, substantially as and for the purpose specified.

15. In a railway-switch, the combination of a slide, means for actuating the same, a switch-lever pivoted on the slide, slides movable at right angles to said slide and operatively connected to move together, and a connection between one of said transverse slides and the switch, as set forth.

16. In a railway-switch, the combination of the slide, the pivoted switch-lever thereon, the double-beveled pin in position to be engaged by the end of the switch-lever, and a slide having inclined surfaces and operatively connected with the switch, as set forth.

17. In a railway-switch, the combination of a slide, means for actuating the same, a switch-lever pivoted on the slide, a double-beveled pin in position to be engaged by the end of the switch-lever, slides movable at right angles to the first-mentioned slide and having oppositely-disposed inclined surfaces, means connecting the two transverse slides to cause them to move in unison, and a connection between one of the said slides and the switch, as set forth.

18. In a railway-switch, the combination of a depressible part and a slide operatively connected therewith, of a switch-lever pivoted on said lever and having its ends doubly pointed, a double-beveled pin in position to be engaged by one end of said lever, and a switch mounted to be actuated by the movement of said slide and switch-lever, as set forth.

19. In a railway-switch, the combination of a depressible part and a slide operatively connected therewith, of a switch-lever pivoted on said slide and having its ends doubly pointed, a double-beveled pin in position to be engaged by one end of said lever, slides movable at right angles to the first-mentioned slide and having inclined surfaces, and a switch operatively connected with and actuated by the movement of one of the transverse slides, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

IRA ROBBINS.

Witnesses:
J. MOORE WHITE,
T. J. MIDDLETON.