

J. H. AINSWORTH.  
Railroad-Switch.

No. 211,541.

Patented Jan. 21, 1879.

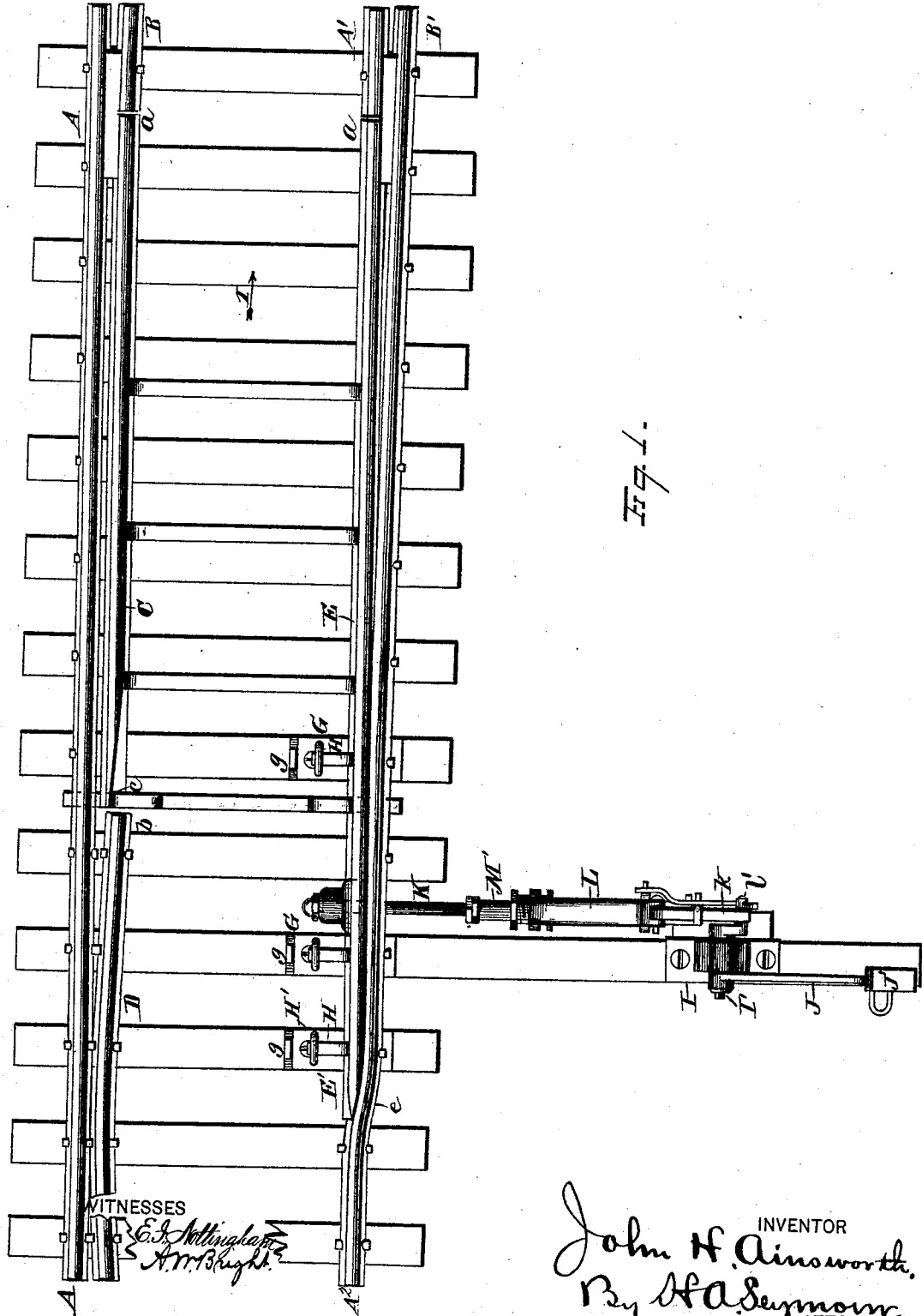


Fig. 1.

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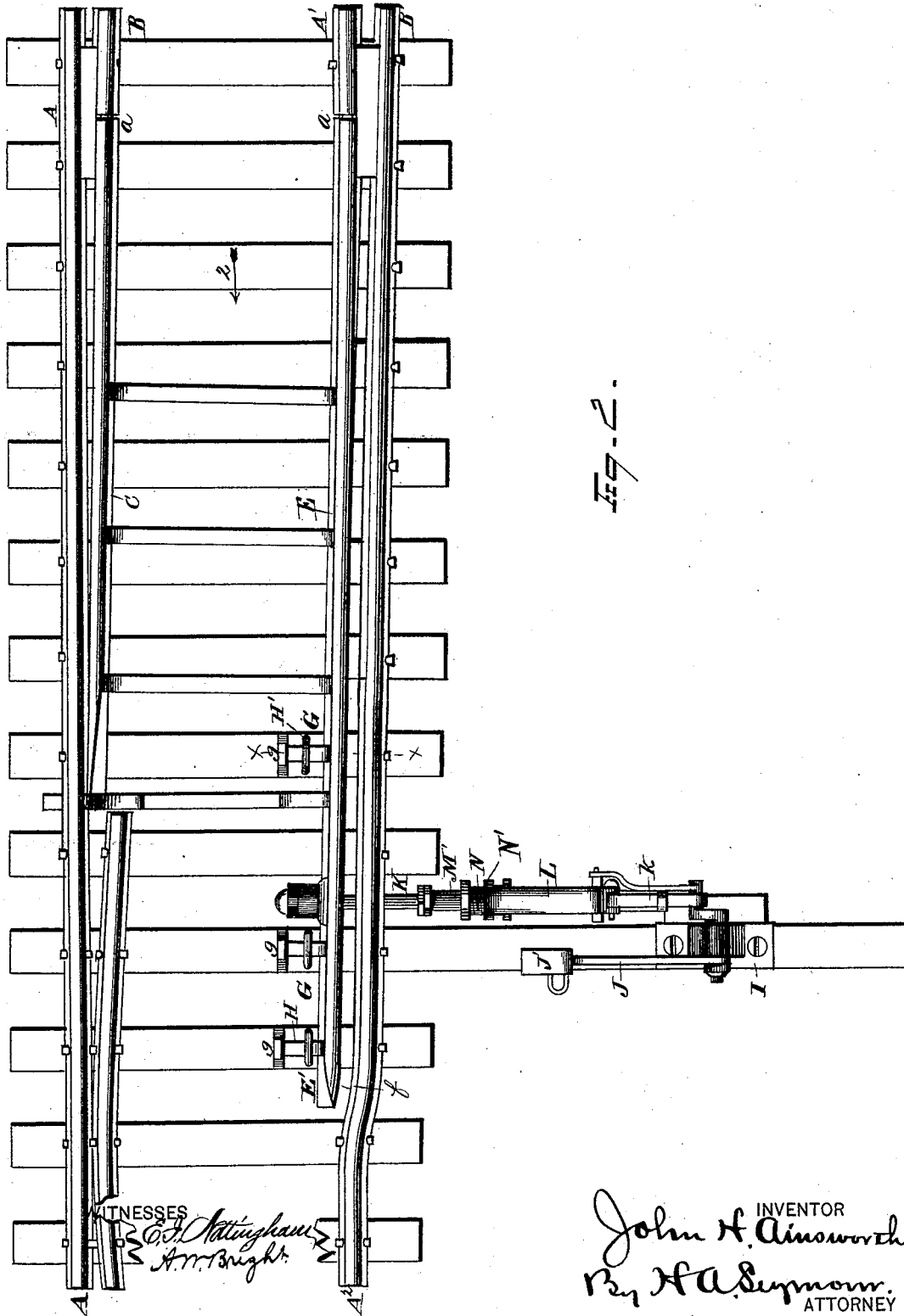


Fig. 2.

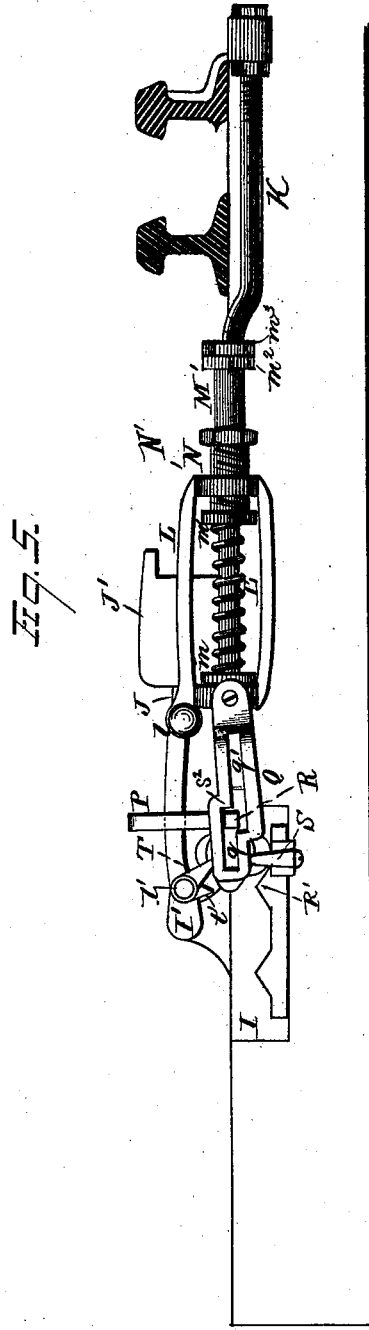
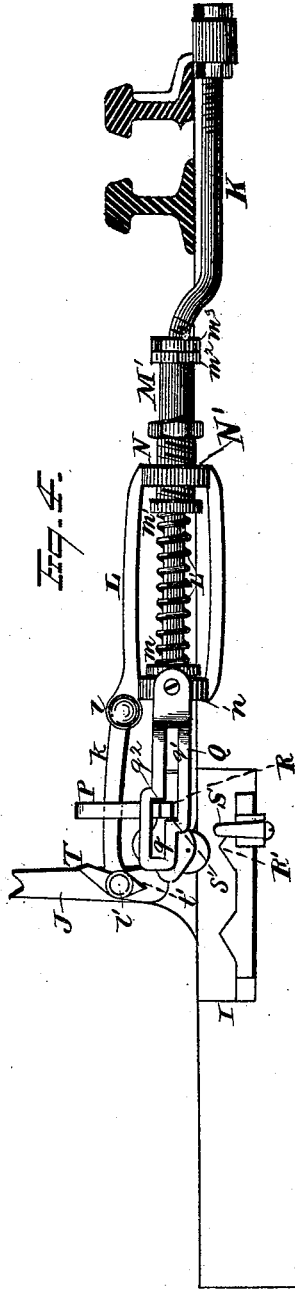
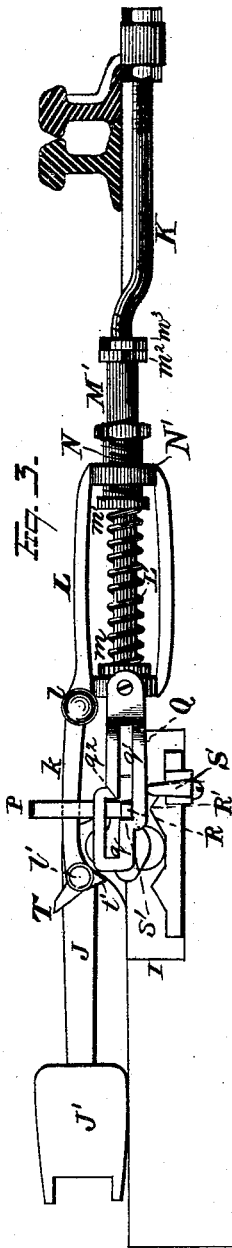
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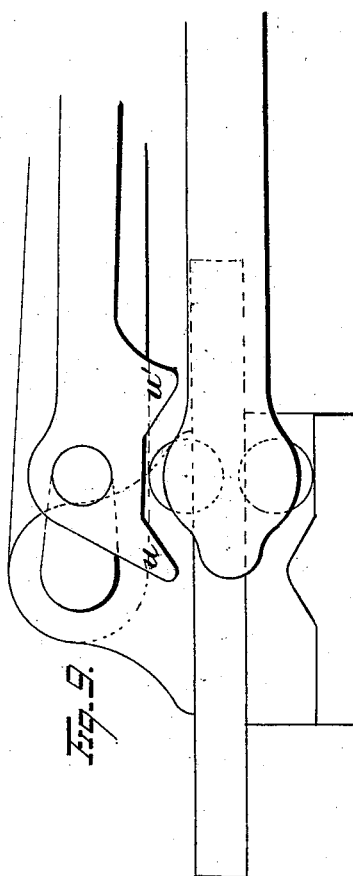
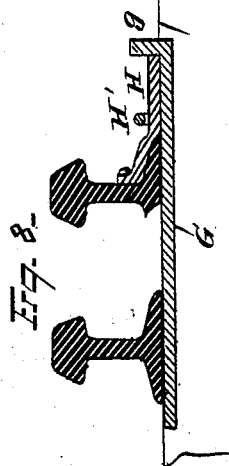
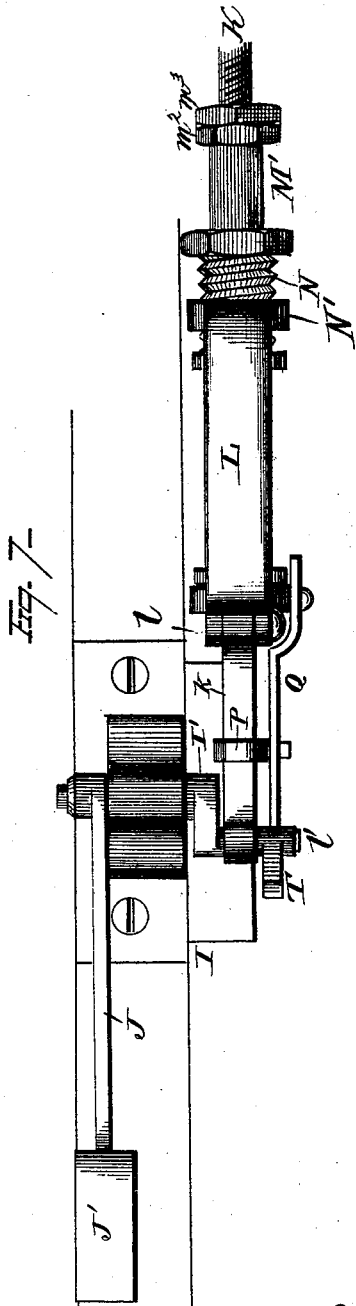
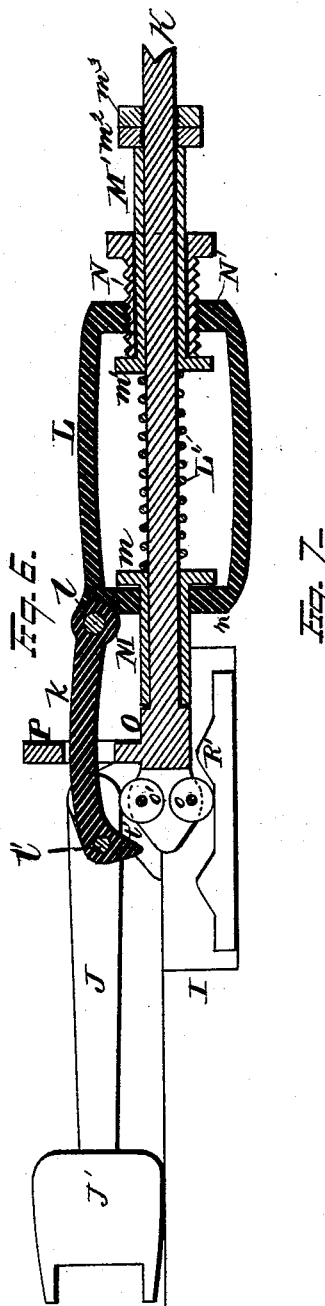
WITNESSES  
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# J. H. AINSWORTH. Railroad-Switch.

No. 211,541.

Patented Jan. 21, 1879.



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# UNITED STATES PATENT OFFICE.

JOHN H. AINSWORTH, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN RAILROAD-SWITCHES.

Specification forming part of Letters Patent No. 211,541, dated January 21, 1879; application filed August 30, 1878.

*To all whom it may concern:*

Be it known that I, JOHN H. AINSWORTH, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Railroad-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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in railroad-switches.

The object of my invention is to provide a railroad-switch of such construction that trains may run from a siding onto the main track without changing the position of the switch-lever, and allowing the switch-rails to be opened and closed without interfering with the passage of trains on the main track, while (the switch being open) trains running in one direction on the main track will automatically close the switch, and thus keep the main track clear.

A further object of my invention is to secure the switch in such a manner that when open or closed the switch-rails may yield or move laterally and allow a train to pass from the siding onto the main track, the switch-operating mechanism being constructed so that a positive and unyielding movement is imparted to the switch-rails when opened or closed by the switchman.

A further object of my invention is to brace the switch-rails, and prevent any undue lateral or vertical movement of the same.

My invention consists in certain combinations of parts, as will more fully appear from the following description and claims.

In the accompanying drawings, Figure 1 is a plan view of my improved switch in a closed position. Fig. 2 is a similar view, showing the switch in open position. Fig. 3 is an enlarged side elevation of the switch-operating mechanism, showing the relative position of the parts when the switch is closed. Fig. 4 is a similar view with the switch thrown part-way open, and Fig. 5 represents the parts in position for holding the switch open. Fig. 6 is a longitudinal vertical section of the switch-

operating mechanism. Fig. 7 is a plan view of the same. Fig. 8 is a transverse section through line *xx* of Fig. 2, to more clearly illustrate the construction of the switch-rail guides and stops. Fig. 9 is a modification.

A represents the outer rail of the main track, and  $A^1 A^2$  are the ends of the inner rail of the same. B is the outer rail of the siding. The inner rail, B', of the siding is located outside the main track, and extends beyond the end  $A^1$  of the main rail, in order that the tread of the wheels of a passing train, either on the main track or to or from the siding, may have a bearing on the rail B', and thus run smoothly over the end of main-track rail  $A^1$  without battering the same. C represents the tapering switch-rail, the heel *a* of which is pivoted to the outer side rail, B, in any desired manner. D is a guard-rail, the end *b* of which is located in close proximity to the point *c* of the tapering switch-rail. This guard-rail prevents the flanges of the wheel from striking the point *c* of the tapering switch-rail when the switch is closed, and also prevents the flange of the wheels from striking the main rail at the angle at the point of main switch-rail at *c*. Between the ends  $A^1 A^2$  of the inner rails of the main track is placed the main switch-rail E, the heel *a* of which is pivoted to the main rail  $A^1$ . The opposite end, E', of the main switch-rail is made tapering, while the adjacent end of the main track-rail  $A^1$  is bent at an angle at *e*.

The object in forming the opposing ends of the main-track rail  $A^2$  and the main switch-rail E as above set forth is as follows: When the switch is closed the flanges of the wheels are prevented from striking the ends of the rails, and all danger arising from such source is obviated; and as the treads of the wheels have a bearing on the side rail B', but little wear is produced on the reduced end of the rail E.

When the switch is open, as illustrated in Fig. 2, and a train is passing from the main track onto the siding, the flange of the wheels will strike the inner incline, *f*, of the tapering end E, and the wheels be thus forced over onto the side rail B'. The bent portion *e* of the main rail, in conjunction with the taper-pointed switch-rail, together constitute ample

flange-room for the wheels, and prevent any binding of the wheel-flanges between the ends of said rails.

I make no claim in this patent to the construction of switch-rails as above described, as it constitutes the subject-matter of my Patent No. 193,206, dated July 17, 1877; but I embody the description of the same herein to fully set forth the operation of my present improvement.

G represents switch-chairs, which are of sufficient length to afford ample lateral bearing for the main switch-rail E as it is in its open and closed position. The inner ends of chairs G are provided with upturned flanges or stops *g*, against which abut the ends of the rail-braces H, which latter are firmly bolted or otherwise secured to the inner side of the main switch-rail E, and thus the latter is prevented from any undue lateral movement in one direction, while the rail B' braces the opposite side of the same when the switch is closed. Staples H' are secured to switch-rail chairs G, and are of ample length to allow the braces H to move to and fro without binding, while they serve to prevent any vertical movement of the main switch-rail and retain its tread on a plane with that of the main rail.

I represents the base of a switch-stand, having a crank-shaft, I', journaled therein. To one end of crank-shaft I' is attached the end of the switch-lever J, the opposite end being provided with a weight, J'. To the main switch-rail E is secured in any desired manner one end of the switch-rod K, upon which is placed a yoke, L. A link, *k*, is hinged at *l* to the outer end of yoke L, while its opposite end is journaled on the crank I'. L' is a spring surrounding the switch-rod K, the opposite ends of said spring resting against the enlarged ends *m m*<sup>1</sup> of the sliding sleeves M M'. Sleeve M' is adapted to be longitudinally adjusted on the switch-rod K by means of the adjusting and jam nuts *m*<sup>2</sup> *m*<sup>3</sup>. Upon the sleeve M' is placed a screw-threaded sleeve, N, which engages in corresponding screw-threads formed on the inner surface of the collar N' on the inner end of yoke L. The inner end of the screw-threaded yoke-sleeve N bears against the enlarged end *m*<sup>1</sup> of the sleeve M', against which rests one end of the spring L', and hence the tension of said spring may be regulated by varying the position of sleeve N. The opposite end of yoke L is provided with a collar, *n*, within which is inserted the sliding sleeve M, that supports the opposite end of the spring L, the enlarged end *m* of the sleeve resting against the yoke-collar *n*.

To the outer end of the switch-rod K is secured or formed solid therewith a bracket, O, and upon the inner or opposite end of the switch-rod is placed the sleeve M'. Bracket O is provided with two anti-friction rollers, *o o*', arranged one above the other, for a purpose hereinafter described.

To the upper side of bracket O is secured or formed therewith a lift-bar, P, having an elon-

gated slot therein, through which is inserted the link *k*. To the yoke-collar *n* is pivoted a guard-plate, Q, having the longitudinal openings *q q*<sup>1</sup>, located in different horizontal planes and connected by a vertical opening or slot, *q*<sup>2</sup>.

R is a pin attached to the side of bracket O and projecting through the opening in the guard-plate Q. The base I of the switch-stand is provided with double or single inclined trackway R' and a guard-plate support, S. A locking-bar, T, is secured to the outer end of the crank-shaft, and, when the switch is open, serves to force the guard-plate down against its support S.

The operation of my improvement is as follows: When the switch is closed, as illustrated in Figs. 1 and 3, and the main track is clear, the crank I' is located slightly below the center of the crank-shaft, and hence yoke L is held in a stationary position by means of the link *k*. When the switch is in this position, if a train should come out of the siding onto the main track, the flanges of the right-hand wheels will force the short switch-rail to the right, and with it the main switch-rail, thus allowing the train to pass onto the main rails of the track, and when the train has left the switch-rails the spring L' operates to force the switch-rails back into a closed position again. It will be observed that when the switch is closed and the switch-rail forced open by a train passing from the side track onto the main track, the bracket O on the end of the switch-rod is forced against the outer end of the sliding sleeve M, which in turn compresses the spring L' between the enlarged head *m* of the sleeve M and the head *m*<sup>1</sup> of the sleeve M', the latter being held stationary by means of the yoke L.

The guard-plate Q is in such relative position to the pin R, attached to the bracket, that the pin has a free longitudinal movement with the switch-rod when the switch is closed. Fig. 4 represents the relative position of the parts when the switch is opened half-way.

By raising the switch-lever the crank raises the link *k*, which, in turn, raises the outer end of the switch-rod by means of the slotted lift-bar P, attached to the bracket O, secured to the outer end of the switch-rod. A positive movement is imparted to the switch-rails by means of the pin R, which engages with the shoulder *s*<sup>1</sup> of the guard-plate Q. This arrangement of parts produces a rigid connection between the yoke and the switch-rod, and enables the switch to be uniformly thrown the required distance. This is an important feature of my invention.

While it is necessary to provide for a yielding movement of the switch-rails when open or closed, it is also desirable that they may be moved in a positive manner when the switch is being opened or closed, in order to insure perfect safety to passing trains. Without some provision for regulating the exact throw of the switch, it would be liable to be left partly opened or closed, as it is often the case that

sand, grit, or ice and snow will clog the switch-rails; and although the switch-lever might be reversed, the spring would yield to the obstruction, and hence the switch-rails would not be moved the proper distance.

By means of my improvement a positive movement is imparted to the switch-rails both in opening and closing the same, and hence, if there are any obstructions to the movement of the switch-rails, they cannot be operated until the obstructions are first removed, and thus all danger resulting from a half-closed switch is obviated. Fig. 5 represents the relative position of the parts when the switch is open.

It will be observed that the locking-bar T on the crank-shaft has forced the guard-plate Q downwardly against the support S, and the pin R is in horizontal line with the upper elongated opening, *g*, and rests against the shoulder *s*<sup>2</sup>, thus again forming a rigid connection between the yoke and switch-rod, and enabling a positive movement to be imparted to the switch-rails when they are being closed.

When the switch is open and the parts are in the position illustrated in Figs. 2 and 5, a train running on the main track in the direction indicated by the arrow 2, the wheel-flanges on the left side of the train will force the main switch-rail to the right, and with it the short switch-rail. This causes the switch-rod to be forced outwardly. The anti-friction roller *o*, journaled in the bracket attached to the outer end of the switch-rod, rides up the inclined trackway R', and forces the upper anti-friction roller, *o'*, in direct contact with the depending lug or projection *t'*, formed on the lower side of link *k*, and raises the crank above its dead-center, the force being sufficient to throw the weighted switch-lever over and close the switch.

It will be observed that when the switch is open and a train is running on the main track in the direction indicated by the arrow 2, the switch-rod is forced outwardly, and the spring thereon is compressed before the end of the anti-friction wheel on the end of the switch-rod has raised the crank upon its dead-center, and hence, when the latter is raised above its center, the spring suddenly expands and operates to throw the crank over to the opposite dead-center with considerable force, and thereby secure the switch in a closed position.

While it is desirable to use anti-friction rollers, as described, to lessen the friction on the parts, yet it is evident that they may be dispensed with and a plain sliding surface provided for accomplishing the same object.

I have illustrated my improvement as being combined with the form of switch illustrated in Letters Patent No. 193,206; but it is also adapted to be equally applied to the form of switch illustrated in Letters Patent No. 196,284, granted to me October 23, 1877.

If desired, the link may be constructed with two projections, *u u'*, as shown in Fig. 9, and

thus the switch be automatically opened and closed in the manner hereinbefore described.

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

1. The combination, with the switch-rails of a railroad-switch, of a switch-rod and switch-lever, connected in a yielding manner, so that the rod may be moved independent of the movement of the lever, and mechanism for automatically locking the switch-rod to the switch-lever when the switch is being either opened or closed by hand, whereby a positive movement may be imparted to the switch-rails in opening and closing the switch, substantially as set forth.

2. The combination, with the switch-rails of a railroad-switch, of a switch-rod attached to one of the switch-rails, a spring located between sliding sleeves on the switch-rod, a yoke provided with collars which form bearings for the sliding sleeves, a link pivoted or hinged at one end to the yoke, and its opposite end journaled on the crank-shaft, and mechanism for raising the link and carrying the crank over its dead-center, substantially as set forth.

3. The combination, with the switch-rails of a railroad-switch and a switch-rod provided with a yoke and a spring, located on the rod between collars on opposite ends of the yoke, of a guard-plate, for forming a rigid connection between the yoke and switch-rod, substantially as set forth.

4. The combination, with the crank-shaft, having a locking-bar attached thereto, of a pin on the switch-rod and a slotted guard-plate pivoted to a yoke supported on the switch-rod, substantially as set forth.

5. The combination, with a switch-rod having anti-friction rollers journaled in the outer end thereof, of a switch-stand constructed with an inclined trackway and a link provided with an inclined depending projection, substantially as set forth.

6. The combination, with the switch-rod K, of the sliding sleeves M M', spring L', yoke L, and screw-threaded sleeve N, substantially as set forth.

7. The combination, with the switch-rod K, provided with the bracket O, of the sliding sleeves M M', spring L', and adjusting-nuts *m*<sup>2</sup> *m*<sup>3</sup>, substantially as set forth.

8. The combination, with the switch-rod K, of the yoke L, provided with collars N' *n*, the link *k*, connecting the crank-shaft and yoke, sliding sleeves M M', and spring L', substantially as set forth.

9. The combination, with the switch-rod K, provided with the lift-bar P, of the spring L', sleeves *m m*<sup>1</sup>, yoke L, and link *k*, substantially as set forth.

10. The combination, with the switch-rod K, provided with bracket O, pin R, and lift-bar P, of the yoke L, link *k*, guard-plate Q, and locking-bar T, substantially as set forth.

11. The combination, with the pin R, con-

nected with the switch-rod, of the guard-plate Q, provided with openings  $q q^1$ , support S, and locking-bar T, substantially as set forth.

12. The combination, with the main switch-rail, having fingers or braces attached to the side of the rail and projecting outwardly therefrom, the lower side of the brace or finger being on a plane with the lower surface of the rail-flange, of switch-chairs provided with end stops, which serve as abutments for the ends of said fingers or braces, and with staples, through which the fingers or braces are inserted, the same serving to prevent the rail from vertical movement, substantially as set forth.

13. The combination, with the switch-rails of a railroad-switch, of a switch-rod and switch-lever, connected in a yielding manner, so that the rod may be moved independent of the movement of the lever, and mechanism attached to the switch-rod for throwing the lever into a locked position, whereby the switch will be automatically closed by a train running in one direction on the main track, and the switch-rails retained in a yielding position to allow a train to run from the siding onto the main track without leaving an open switch, substantially as set forth.

14. The combination, with the switch-rails of a railroad-switch, of a switch-rod and switch-lever connected by an interposed spring, and mechanism for automatically locking the

switch-rod to the switch-lever when the switch is being opened or closed, and automatically releasing said parts when the switch is in either an open or closed position, whereby a positive movement is imparted to the switch-rails when they are being moved to an open or closed position, and when placed either in an open or closed position the switch-rails are retained in position by spring-power, substantially as set forth.

15. The combination, with the switch-rails of a railroad-switch and a switch-rod rigidly secured to one of said switch-rails, of a crank-shaft having a switch-lever attached to one end thereof, and the crank connected with the switch-rod in a yielding manner, and devices attached to the outer end of the switch-rod for raising the crank above its dead-center and shifting the switch-lever from an open to a closed position, whereby a train may run from the siding onto the main track without leaving an open switch, while the wheel-flanges of a train running on the main track in one direction will automatically close the switch if left open, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of August, 1878.

JOHN HENRY AINSWORTH.

Witnesses:

HENRY POLSZ,

F. A. MANDERFIELD.