(No Model.) 3 Sheets—Sheet 1.

T. MORGAN & J. BAKER.

FROGLESS AUTOMATIC RAILROAD SWITCH.

No. 343,052. Patented June 1, 1886.

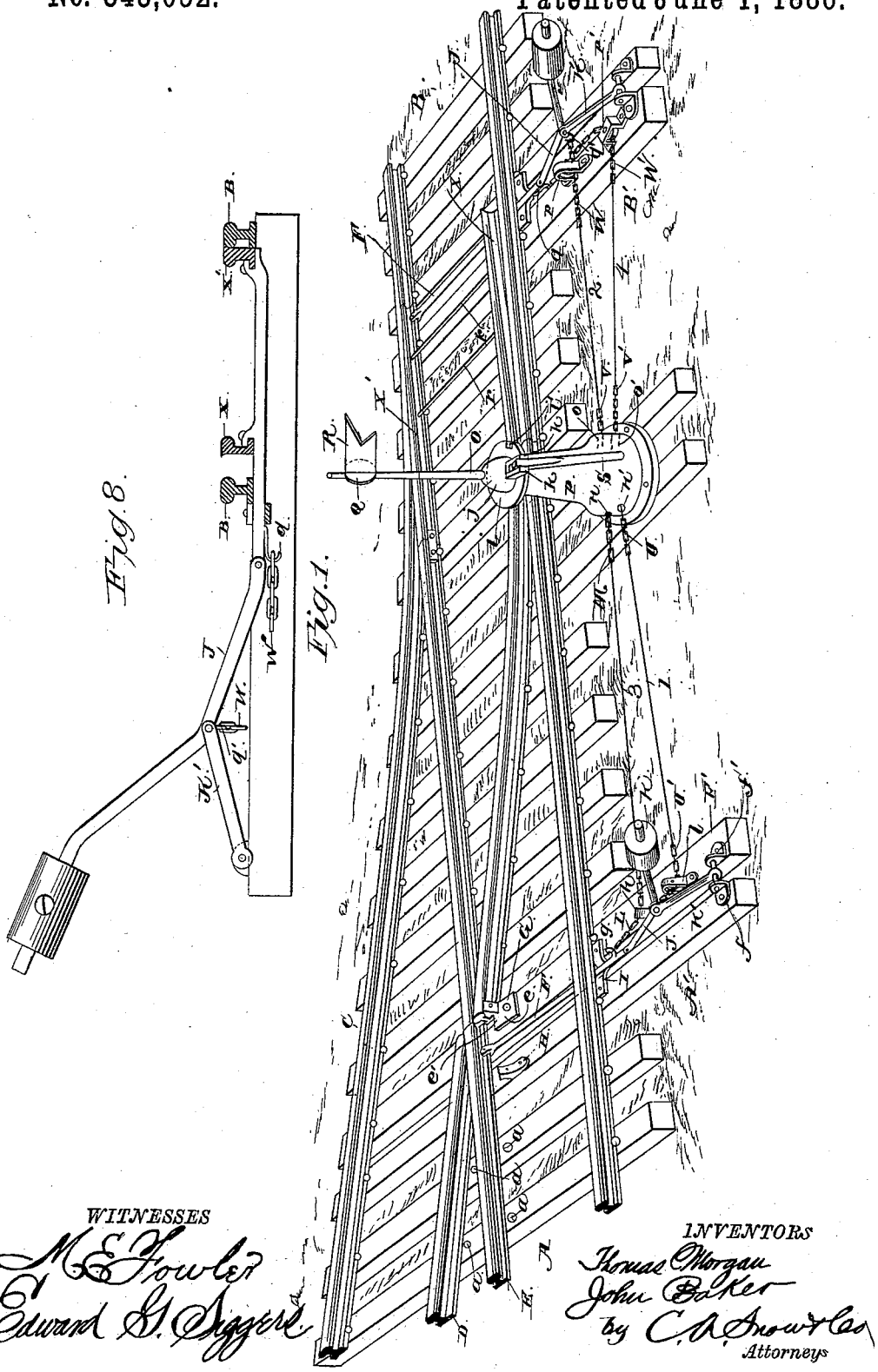

Fig. 1.

Fig. 8.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

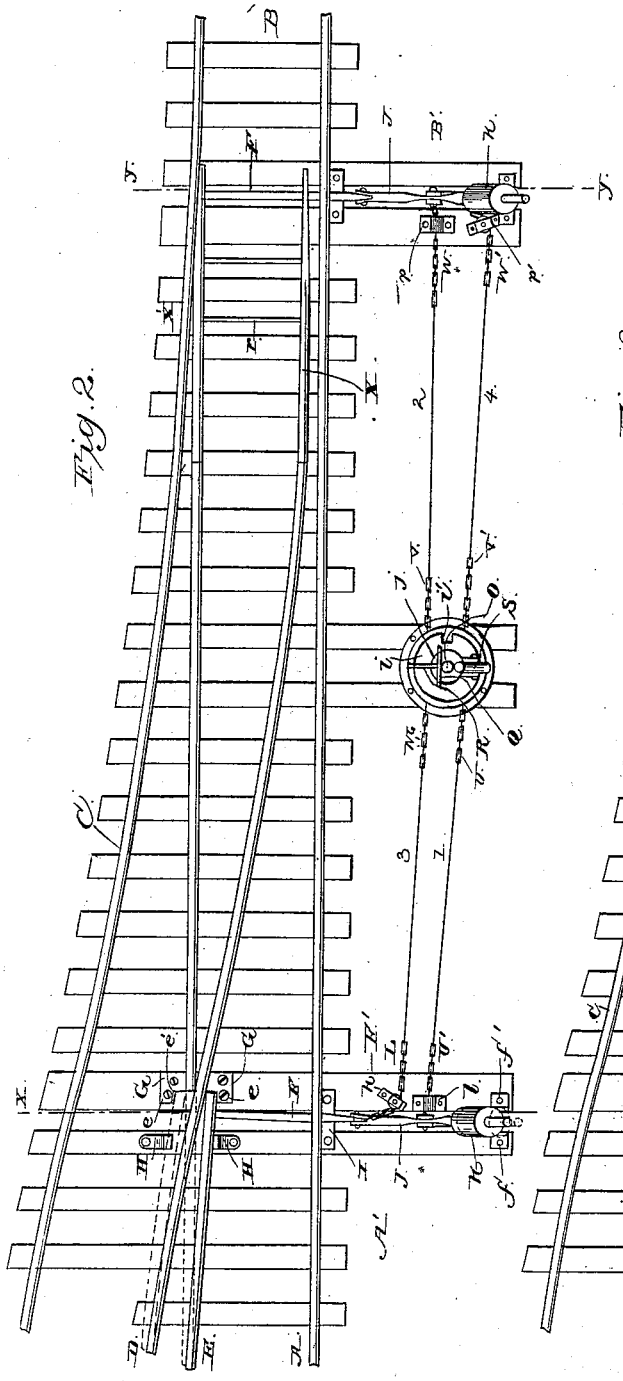
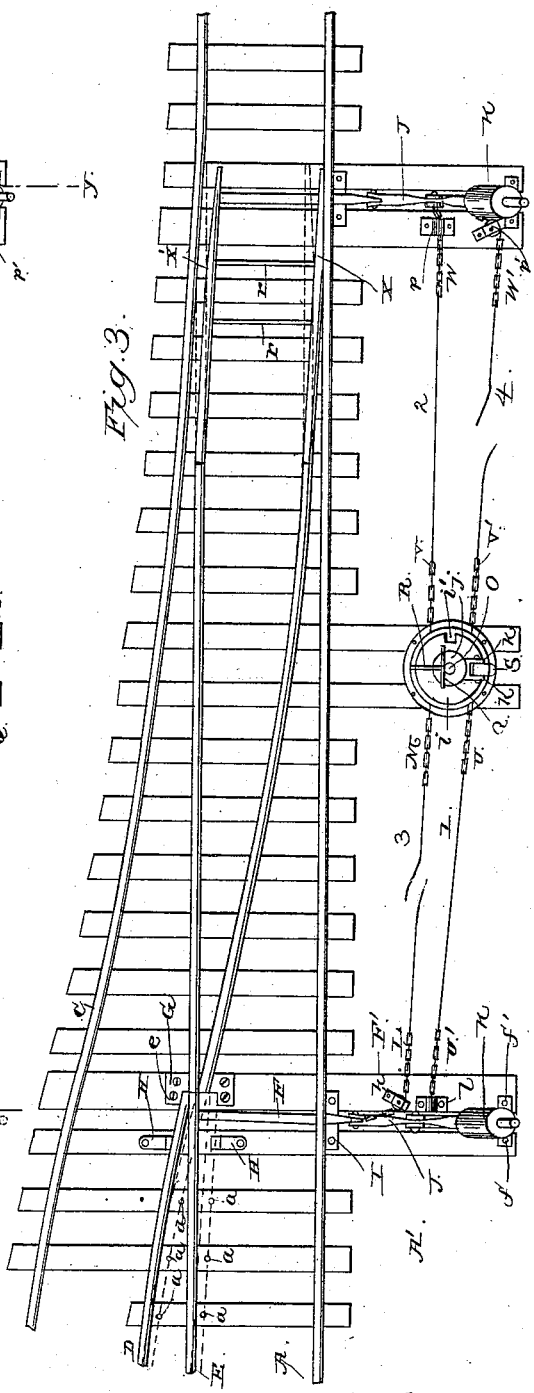


Fig. 3.



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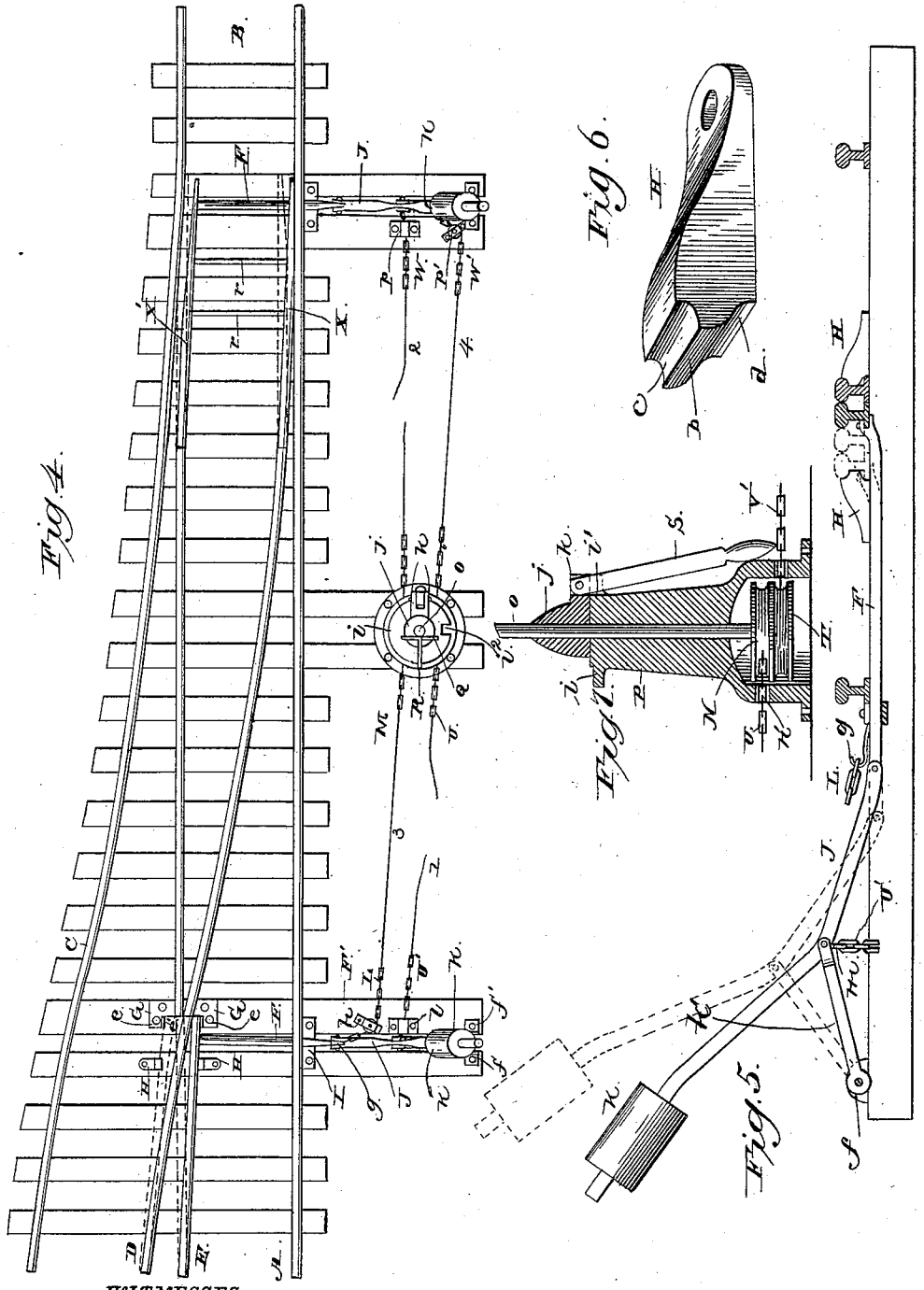

Fig. 4.

Fig. 6.

Fig. 7.

Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS MORGAN AND JOHN BAKER, OF CHICAGO, ILLINOIS.

FROGLESS AUTOMATIC RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 343,052, dated June 1, 1886.

Application filed June 30, 1885. Serial No. 170,269. (No model.)

To all whom it may concern:

Be it known that we, THOMAS MORGAN and JOHN BAKER, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Frogless Automatic Railroad-Switches, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to automatic railroad-switches, and has for its object to improve the construction of the same, whereby additional safeguards will be provided against the numerous accidents which often occur through the negligence of the switchman, so that in case he should fail to properly set the switch for the coming train the latter will be caused to automatically open the switch, and thus avoid the dangerous results to life and limb which would otherwise happen.

With this end in view the said invention consists in the improved construction, combination, and arrangement of the several parts, as will be hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of our improved railway-switch, showing the switch-rails locked in the proper position for a train running on the main track. Fig. 2 is a plan view showing in full lines the position of the frog-rails of switch branch A′ after being operated by the passing train from a side track, and in dotted lines the frog-rails in their normal position to keep the main track open. The point switch-rails of switch branch B′, not having been operated by the train, are therefore shown in their normal position. Fig. 3 is a plan view, the switch having been set for the side track and left so by the neglect of the switchman, the train running on the main track operating the frog-rails of switch branch A′, and throwing them to the position shown in full lines, the cord or chain which connects the switch with the stand being broken by this action, the point switch-rails of switch branch B′ being also operated in a similar manner, the full lines indicating the position of the point switch-rails before they are operated, and the dotted lines represent the position assumed by the said rails after the wire 4 is broken. Fig. 4 is a plan view similar to Fig. 2, but differing therefrom in the fact that the rails of both switch branches A′ B′ are connected to and locked by the switch-stand to keep the main track open, as shown in dotted lines, the train from the side track operating both switch branches to break the connecting cords or wires and push the switch-rails over to the position shown in full lines, and thus allow the passage of the train. Fig. 5 is a vertical transverse section on the line *x x*, Fig. 2. Fig. 6 is a detail view of one of the check-blocks. Fig. 7 is a vertical longitudinal section of the switch-stand. Fig. 8 is a vertical transverse section on the line *y y*, Fig. 2.

Like letters are used to indicate corresponding parts in the several figures.

Referring to the drawings for purposes of illustration only, the letters A B are used to designate the respective ends of the main track; C, the side track, and A′ B′ the respective branches of the switch which connect the side track with the main track. At the switch branch A′ the inner rail, D, of the side track and the adjacent rail, E, of the main track are connected together at their forward ends by the operating-bar F. The rail E of the main track extends normally in a straight line, and at its rear end is rigidly held by being spiked to the ties, its forward end being capable of a lateral movement within fixed limits, for a purpose well known. The rail D of the side track is also rigidly held at its rear end, and has a lateral movement at its front end, and being connected to the rail E they will both be moved together by the same movement of the bar F. A series of spikes, *a*, project upward from the ties at proper distances from the said rails D E, this distance being increased from the rear to the front end of the rail, said spikes serving to limit the movement thereof. Check-blocks H are secured to one of the ties, in rear of the front end of the two rails D E and on each side thereof, to prevent said rails from being moved too far by the action of the train. These blocks H have their ends facing the rails provided with a curved or rounded extension, *b*, to fit the side of the rail between the head and the flanged base, a projecting lip, *c*, to catch against the head of the rail, and a cut-out portion, *d*, to receive the flanged base thereof. By this construction of check-block the frog-rails D E are held from moving beyond certain points, and when the extreme limits have

been reached the rails cannot possibly be displaced either laterally or in an upward direction.

The extreme front ends of the rails D E rest upon and are moved laterally over the upper sides of a tie, (which is designated more particularly by the letter F'.) The chair G, which secures the inner side and main track rail rigidly together, is spiked to the opposite side of the tie F', and is provided with rearward extensions *e*, which have their inner ends turned upward, as at *e'*, so as to catch over the flanged base of the rails D E when the latter are moved to either side. The operating-bar F, after passing through the meeting front ends of the rails D E, extends along one side of a tie, F', across the main track, and below the outer rail thereof, the bar being supported by and working in suitable hangers or brackets, I. The outer end of this bar F is connected or pivoted to an inclined lever, J, having at its upper end a weight, K, which may be made adjustable along the lever as desired. In Fig. 8 we have shown the weight adjustable by means of a screw. To the center of the lever J is pivoted a lever, K', which has its lower end formed with laterally-projecting pins, providing trunnions which are journaled in a pair of plates, *f f'*.

L designates a chain attached at one end to a hook, *g*, provided on the bar F, and passing through a horizontally-arranged pulley, *h*, attached to the tie F', the other end of the chain being connected to one end of a line-wire, (designated by the figure 3.) The other end of this wire is connected to the end of a short length of chain, M, the latter being connected to the upper windlass, N, which is mounted in a horizontal line on the lower end of a vertical bar, O, which passes through the switch stand or casing P and extends upward therefrom a sufficient distance. To the upper outer end of the vertical bar O is attached a disk, Q, carrying at right angles thereto a suitable signal-board, R, for the purpose well known. At the top of the switch stand or casing P is provided an annular flange, *i*, notched at the points *i' i²*. To the vertical bar O, above this flange *i*, is secured a band or collar, *j*, provided with outwardly-extending ears *k*, between which is pivoted the inner end of the operating-lever S. At the extreme lower end of the bar O, below the windlass N, is fitted a similar windlass, T.

It will be observed that when the lever S is operated or turned in either direction the bar O is rotated to cause the turning of the windlasses simultaneously, the lever being dropped so as to fit within either of the notches *i' i²*, and in this manner lock the switch. At a suitable point on the windlass N, some distance away from the point where the chain M is attached, is connected a short length of chain, U, which has its outer end connected to a length of wire, 1, the latter being attached to a chain, U', which works through a vertically-arranged pulley, *l*, secured to the tie F', said chain being attached to a hook, *m*, projecting from the lever J. Holes *n n'* are provided in the sides of the switch-stand for the passage of the chains M and U, and said switch-stand is preferably mounted on or spiked to the extensions of the ties. To the windlass T are attached a pair of chains, V V', which pass through holes *o o'*, provided in the switch-stand, the outer end of said chains being connected to lengths of wire, (designated, respectively, by the figures 2 4.) These wires are each connected to chains W W', working through pulleys *p p'*, and connected to hooks *q q'*, attached to the lever J and lever K of the switch branch B'. The construction and attachment of the lever J, lever K, and the operating-bar F are similar to those of the switch branch A', which have been described, and therefore need not be repeated.

The inner rail of the side track is provided at the point where the switch branch B' is arranged with a pivoted switch-rail, X, which is pointed or tapered at its front end in the usual manner. The main-track rail adjacent to the side track is also provided with a pivoted switch-rail, X', which is constructed in a similar manner to the rail X, these two rails X X' being connected together by tie-rods *r*, so as to move together. The operating-bar F of the switch branch B' is connected to the lever J, and passes below the outer rail of the main track and along the latter, and is secured to each of the point switch-rails X X', so that the operation of the bar F causes both rails to move simultaneously.

It will be understood that when the parts are in their normal position the frog-rail E of the switch branch A' is on a line with the main-track rail, while the switch-rail X' of the switch B' has its pointed front end bearing against the outer rail of the side track. In this position the main track is open from one end, A, to the other end, B, so that a train running on the main track will have its passage unobstructed. The switch-rails may be retained in their normal position, as described, solely by the action of the weight on the upper end of the lever J; but as the rails are liable to be accidentally shifted it is found necessary to employ the connecting-chains and line-wires 1 2 3 4, by means of which the switch-rails may be locked in either of the positions desired. It will also be understood that the connection of the line-wires 1 2 3 4 by their respective chains to the windlasses N T of the switch-stand is such that the wires 3 4 are operated together by one movement of the handle or lever S, and the wires 1 2 slackened by the same movement, while by a reverse movement of the handle S the wires 1 2 are tightened and the wires 3 4 caused to lose their tension. This is effected by attaching the chains M U on opposite sides of the center of the windlass N, so that when the windlass is operated the chain M is wound thereon, while the chain U is unwound. The chains V V' are connected in a similar manner to the

windlass T, and are worked correspondingly. Thus the chains U V will be worked together or wound upon their respective windlasses T N when the handle or lever S is operated to partially rotate the vertical bar O, and the chains V′ M are unwound by the same movement. When the handle or lever S is operated, it is worked over the flange *i* of the switch-stand P until it reaches the notch i^2, when it is swung or dropped down so as to be received within the notch, and in this manner the wires 1 2 will be locked, (see Fig. 4,) effecting a corresponding locking of the switch-rails and retaining the switch-rails set for the main track, as shown in dotted lines in Fig. 4, at which position it is necessary to break the wires 1 and 2 and push the switch-rails over should a train be entering from the side track. By the operation of the handle or lever S in the reverse direction until it reaches the first notch, i^2, the bar O is operated to turn the windlasses N T, this action causing the chains M V′ to be wound on their respective windlasses and the chains U V to be unwound, carrying the switch-rails over to the position shown in dotted lines, Fig. 3, for the frog-rails, and in full lines for the point switch-rails. The switch-rails are locked in this position by the lever S entering the notch i^2.

It will be observed that each of the wires 1, 2, 3, and 4 affords a fragile connection of the chains intermediately between the two sets. For instance, take the wire 1, which connects the chains U U′, and which provides a fragile connection between the two. Now, since the wire is more fragile than the chains, the wire will break first when tension or strain is brought upon the connection during the time the switch is locked. The wires can readily be replaced and joined together after they have been broken, while the chains themselves will last for a long time.

The operation of our invention will be readily understood from the foregoing description, taken in connection with the annexed drawings.

In Fig. 1 the switch-rails are shown as locked in their normal position, to allow a train to run on the main track from one end to the other, the frog-rail E being on a line with the main-track rail while the point, switch-rail X′ fits against the inner side of the side-track rail. Suppose, while the parts are in the position stated, that a train is entering from the side track, the switchman having failed through negligence to properly set the switch for this train. As the train passes along, the flange of its wheels acts upon the frog-rail D of the side track, and since this rail is connected to the adjacent rail, E, of the main track both rails will move laterally to the position shown in full lines in Fig. 4, this movement of the frog-rails pushing the bar F outward, raising the lever J, and drawing the chain U′ through its pulley L, and causing increased tension to come upon the wire 1. This tension is sufficiently great to cause the breaking of the wire 1, which thus allows the shifting of the frog-rails to the extreme limit of their movement, the rail D coming on a line with the side-track rail, and allowing the train to pass along until it reaches the switch-rail X of the switch branch B′. This rail X is held away from the main-track rail by the line 2, so that if the train presses the rail X laterally against the main track the bar F will be worked outward, drawing the chain W upward, and increasing the tension on the wire 2 to such a degree as to break it. As soon as the train passes over the switch branches A′ B′, the rails D E X X′ are caused to assume their normal position by the weight on the upper end of the lever J, the main track being again open along the line, as before. Suppose that after the switch has been set for a side track and locked in that position, as shown in dotted lines, Fig. 3, the switchman neglects to restore the switch to its normal condition, a train being due along the main track. The frog and switch rails are locked in this position by the wires 3 4, connecting with the switch-stand. As the train enters the main track from the end A, the wheels of the same will act upon the frog-rails E D and throw them outward until the rail E comes on a line with the main-track rail, (see Fig. 3,) this movement causing the wire 3 to be broken. The train continues along the main track until its wheels strike the switch-rail X′, forcing the latter outward against the side-track rail, as shown in Fig. 3, this movement causing the wire 4 to be broken. By this arrangement we provide an automatic-operating switch which will be worked solely by the wheels of the train. We are also enabled to provide a switch which will prove a safeguard against the numerous accidents caused by the neglect of the switchman to properly set the switch for the coming train. It will be observed that no matter whether the switchman has failed to do his duty or not, the switch will be opened at the proper time to allow the safe passage of the train from either the side track or the main line.

In Fig. 2 the frog-rails are shown in dotted lines as adjusted for the main track, the wires 1 2, which hold the switch-rail in this position, being connected to the switch-stand, but not locked. Thus as the train enters from the side track its wheels will strike the frog-rails and push them laterally, as shown in full lines, to allow the train to continue onward to the switch branch B′, which it operates in a similar manner. As the lever S is not locked, the wires I will not be broken, but will allow the working of the parts, as shown. The moment the train leaves the switch-rails the weight K on the lever J automatically restores the rails to their normal position.

It will be understood that the main track is designed to be opened at all times; but the switchman is enabled, by operating the lever S, to switch trains from the side track onto the main line, as will be readily understood.

It will be observed that by the arrangement of the notches on the switch-stand to receive the lever S the switch cannot be locked until the windlass has been operated to a proper degree to cause the switch-rails to align with either the side track or main track, and when this is done the lever may drop into either of the notches provided in the switch-stand.

By our invention we provide a simple improvement in this class of devices, the switch being operated with ease and rapidity, and working in such a manner as to demonstrate to those skilled in the art its practicability, efficiency, and safety.

Having described our invention, we claim—

1. The main track and side track, in combination with the switch-rails working between the two tracks and adapted to be shifted from one to the other, the switch-operating bar, a weighted lever connected to the said bar, cords, chains, or wires also connecting with the bar, and devices for locking the chains or wires, whereby should the switch-rails be out of position the train will be caused to operate the rails by breaking the cords or chains, the weighted lever restoring the switch-rails to their normal position, as set forth.

2. The main track, side track, and switch-rails, in combination with a windlass, a section of chain connecting with the switch-rails, another section of said chain wound around the windlass, and a length of wire or other material more fragile than the chains connecting the two sections of chain together, operating means for the windlass, and devices for locking the said operating means, as set forth.

3. The main track, side track, and switch-rails, in combination with cords, chains, or wires connecting with the switch-rails, devices for drawing the chains or wires tight and locking them to hold the switch-rails in their adjusted position, whereby should the switch-rails be out of position for a passing train the latter will operate against the rails, causing the breaking of the cords or chains, and mechanism connecting with the switch-rails to automatically restore them to their normal positions and keep the main track always open, as set forth.

4. The main track and side track, in combination with the frog-rails arranged normally on a line with the main track, and a pair of chains or wires connecting with the frog-rails, one chain or wire holding the rails in their normal position and the other chain retaining it on a line with the side track, the switch-stand, vertical operating-bar, the windlass to which the chains or wires are connected, and a handle for operating the bar, for the purpose set forth.

5. The main track and side track, in combination with the frog-rails arranged normally on a line with the main track, and two sets of chains or wires connecting with the frog-rails to hold them in their adjusted position, and a switch-stand, the double windlass located therein, and on which the two sets of chains or wires are wound, and the operating-handle for operating the windlass, as set forth.

6. The main track and side track, in combination with the frog-rails arranged normally on a line with the main track, two sets of chains or wires connecting with the frog-rails, one set holding the rails in their normal position and the other set holding them on a line with the side track, the double windlasses on which the chains or wires are wound, the operating-lever for the same, and means for holding the lever in its adjusted position, as set forth.

7. The main track and side track, in combination with the frog-rails arranged normally on a line with the main track, two sets of chains or wires connecting with the frog-rails, one set holding the rails in their normal position and the other set holding them on a line with the side track, windlasses on which the chains or wires are wound, an operating-lever for the same, the switch-stand, the vertical operating-bar, a signal carried by said bar, and means for locking the operating-lever in its adjusted position, the operation of the lever causing the turning of the bar to show the proper signal, as set forth.

8. The main and side track, in combination with the switch-rails, chains or wires connecting with the switch-rails, the switch-stand, a windlass located within the stand, a vertical standard to which the windlass is connected, a lever for operating the standard to wind the chains or wires on the windlass, and devices for locking the lever when turned to the proper degree, as set forth.

9. The main track and side track, in combination with the switch-rails of the two switches, two sets of chains or wires connecting with the switch-rails, a double windlass on which the chains or wires are wound, and a handle-bar for operating the windlass and locking it, as desired, for the purpose set forth.

10. The main track and side track, in combination with the switch-rails, chains or wires connecting with the frog-rails, windlasses on which the chains or wires are wound, a signal operated by the turning of the windlass, and an operating-lever for working the windlass and holding it in the adjusted positions, as set forth.

11. The main track and side track, in combination with the switch-rails, the chains or wires connecting with the rails, the switch-stand, the vertical operating-bar, the windlass located on the bar, and a hinged lever connected to the bar and adapted to be dropped down and held in its adjusted positions, as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

THOMAS MORGAN.
JOHN BAKER.

Witnesses:
GODLEPH GRONSO,
ROBERT R. GRIFFITH.