(No Model.) 3 Sheets—Sheet 1.

F. N. KELSEY & W. A. STEVENSON.

AUTOMATIC RAILWAY SWITCH.

No. 377,941. Patented Feb. 14, 1888.

Fig. 1

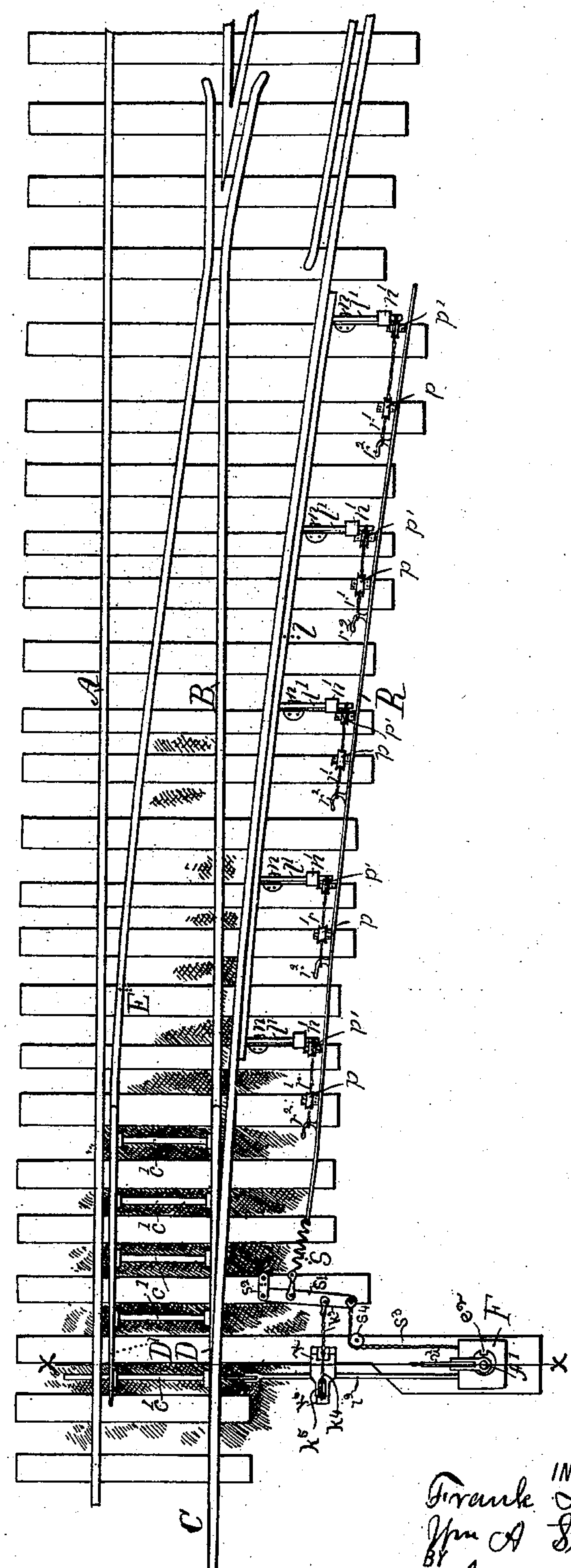

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Fig. 2

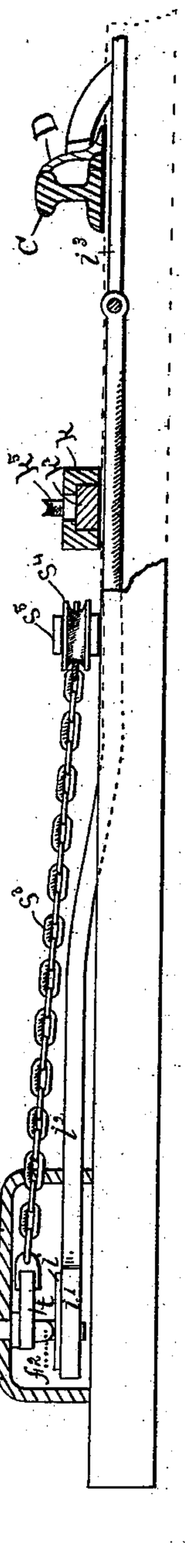

Fig. 3

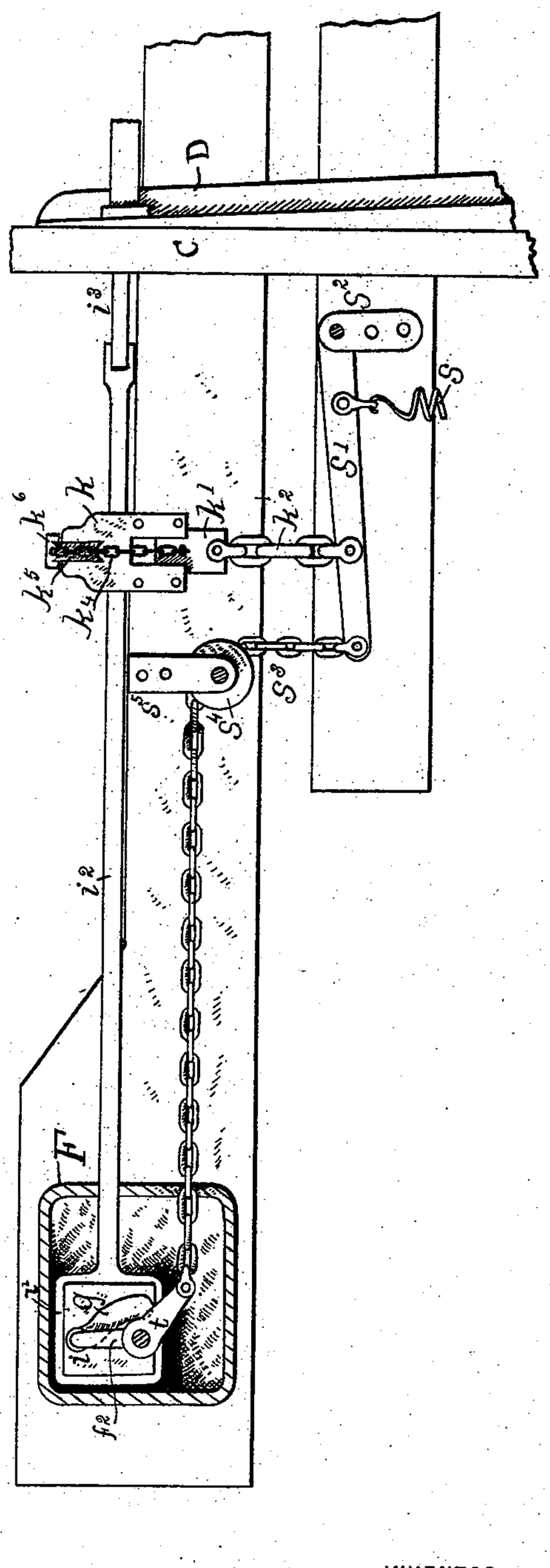

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Fig. 1

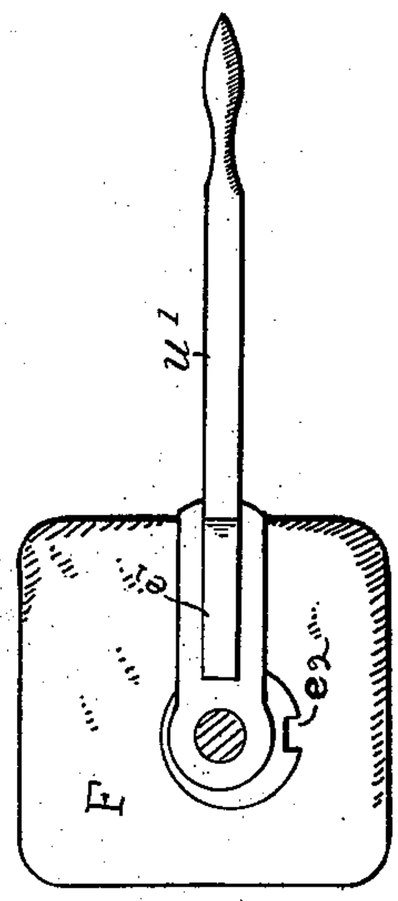


Fig. 8

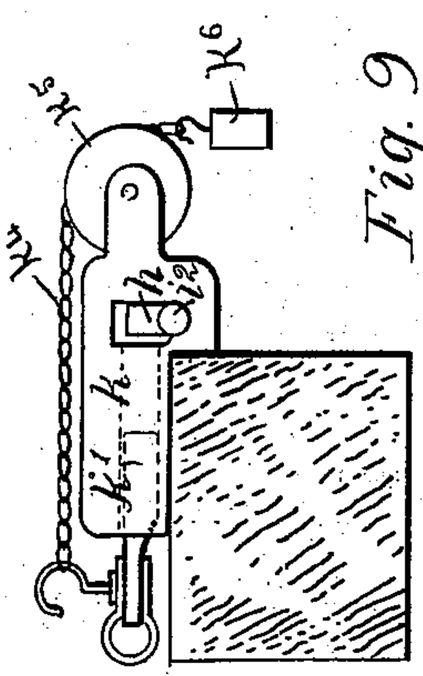


Fig. 9

Fig. 4

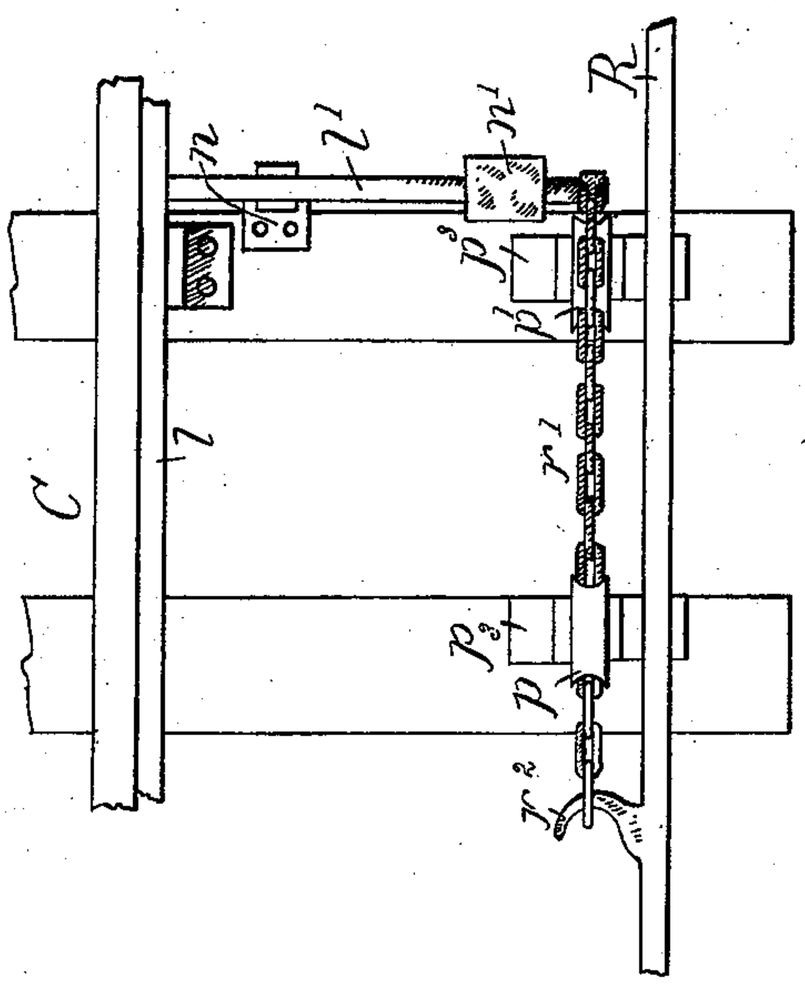


Fig. 5

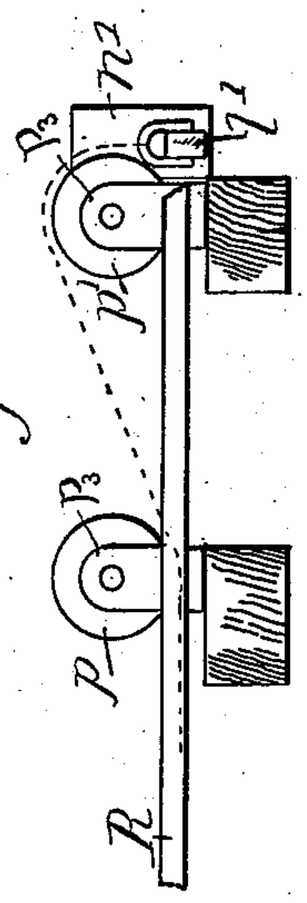
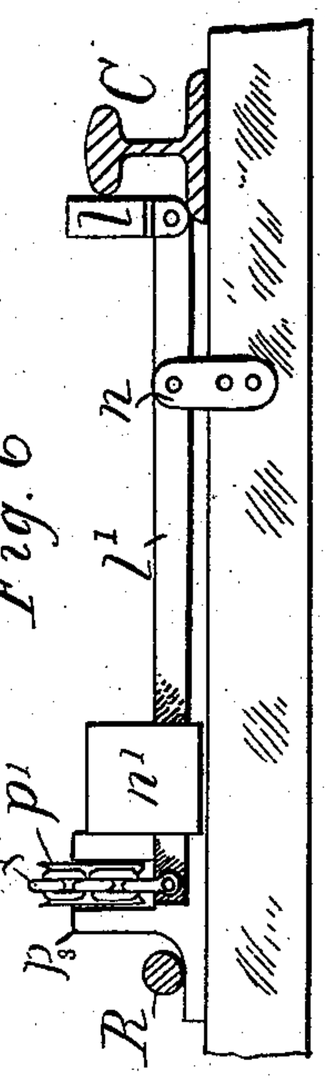


Fig. 6



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UNITED STATES PATENT OFFICE.

FRANK N. KELSEY AND WILLIAM A. STEVENSON, OF NEW HAVEN, CONNECTICUT.

AUTOMATIC RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 377,941, dated February 14, 1888.

Application filed March 29, 1887. Serial No. 232,928. (No model.)

To all whom it may concern:

Be it known that we, FRANK N. KELSEY and WILLIAM A. STEVENSON, citizens of the United States, residing at New Haven, in the State of Connecticut, have invented a new and useful Improvement in Automatic Railway-Switches, of which the following is a specification.

The object of our invention is to provide an improved automatic railway-switch adapted to automatically close and to restore and maintain the continuity of the main line, except when it is held open by a switchman or by a switching train.

The invention consists in the novel mechanism for holding the switch open by the weight of the switching train, in the novel means for positively locking the switch when open, and in the mechanism for restoring the switch after the switching train has passed or the switch-handle is released by the operator.

In the accompanying drawings, Figure 1 is a plan view of our improved switch. Fig. 2 is a part sectional transverse elevation on the line *x x*, Fig. 1. Fig. 3 is a plan view of Fig. 2. Fig. 4 is a detailed view of a section of the tread-plate and its operating mechanism. Figs. 5 and 6 are elevations of Fig. 4. Fig. 7 is a plan view of the switch-stand. Fig. 8 shows a side elevation of the lock mechanism, and Fig. 9 shows a portion of the switch-rod.

Referring to the drawings, A denotes the continuous rail of the main line, and B is the broken rail of the same.

C is the main-line rail, which is continuous with the outer rail of the branch track, this switch being of that form ordinarily known as a "split switch," and preferred in automatic switches.

D D′ are the switch-points connected by the tie-bars C′, and hinged, respectively, to the end of the broken rail B and to the end of the inside branch track, E. When the switch-point, which is a continuation of the broken main-line rail, lies against the continuous main and branch rail, as best shown in Fig. 1, the switch is closed and the main line is then continuous. When the opposite switch-point, which is a continuation of the inside branch rail, E, is thrown against the continuous main-line rail, the switch is open and the main line is broken. This is an ordinary and well-known form of switch and needs no further description.

F designates a switch-stand, in which is journaled a switch-shaft, *f′*, formed with an ordinary switch-crank, f^2, at its lower end. The crank extends through a rectangular slotted cam-block, *i*, which is fitted in a corresponding head, *i′*, in a switch-rod, i^2. The switch-rod is hinged to a short rod, i^3, which is fastened to the tie-rod *c′* at the point of the switch. The crank f^2 is adapted to turn through about a quarter of a revolution, and the cam-slot *g* is so shaped that the switch-rod i^2 is thrown over by a portion of the entire movement of the crank, and the balance of the cam-slot is extended concentric with the axis of the switch-shaft, so that the crank continues to move after the switch is thrown open.

The switch-rod i^2 is provided with a projection or shoulder, *h*, (see Figs. 8 and 9,) and passes through a slotted frame, *k*, which is bolted to the tie near the rail. A similar block, *k′*, is fitted in the ways of the frame *k*, and is adapted to slide in back of the projection on the switch-rod when the switch is open and hold it securely locked in that position.

On the outer side of the continuous main and branch rail *c* is arranged a tread-plate, *l*, which is of sufficient length to bridge the longest spaces between the trucks of the train, so that the wheels of a switching train will bear uninterruptedly upon it. The tread-plate is supported upon the ends of a series of levers, *l′*, fulcrumed upon suitable bearings, *n*, which are secured to the ties.

Upon the opposite end of each lever a weight, *n′*, is fastened, and the weights are sufficiently heavy to preponderate over the weights of the tread-plate and hold it elevated above the tread-rail.

Adjacent to the outer end of the levers is a rod, R, arranged lengthwise of the tracks. A series of suitable chains, *r′*, are attached at one end to hooks r^2 upon the rod and conveyed under a series of guiding-pulleys, *p*, and over another and similar set of pulleys, *p′*, and attached at their opposite ends to the outer ends of the levers. The pulleys are mounted in

suitable bearings, p^3, which are bolted to the ties, and the rod R is laid and adapted to slide upon the flanges of the pulley-bearings.

Upon the end of the rod nearest to the switch-stand is secured a short coiled spring, s, and the spring is shackled at the other end to a lever, s', which is fulcrumed at one extremity to a bearing, s^2, bolted upon a tie.

To the opposite end of the lever is attached a chain, s^3, which passes around a suitable pulley, s^4, and is shackled to a rock-arm, t, upon the switch-shaft. The pulley s^4 is mounted in a suitable bearing, s^5, bolted to the tie upon which the switch-stand is set. A chain, k^2, is attached at one end to the lever s' and connected at its opposite end to the lock-block k'. Another chain, k^4, is attached at one end to the lock-block and passed over a roll, k^5, mounted in the frame k, and the other end of the chain is attached to a weight, k^6, which acts to draw the lock-bolt in over the switch-rod i^2, and the projection h on the rod is so placed that the lock-block will enter behind it when the switch is thrown open.

A spiral spring, u, is coiled around the switch-shaft, with one end bearing against a projection, f^3, on the shaft, and the opposite end bearing upon the switch-stand. The coil is wound and arranged in the direction to close the switch when opened. The switch-handle u' is pivoted to swing in a vertical plane in an arm, u^2, which is secured to the switch-shaft f'' above the stand F. A pawl, u^3, is pivoted in the arm u^2, between the switch-handle and the shaft, and formed with a projection, e', which extends over the inner end of the handle. The top of the switch-stand is formed with a notch, e^2, at the point immediately under the pawl when the switch is open, and the surface of the top of the stand is shaped eccentric to the switch-shaft, so that as the lever is turned the pawl rides upon the eccentric-surface and falls into the notch e^2 when the handle is thrown clear around to its open position.

The pawl then holds the switch-shaft, and prevents it from turning so long as the lever is held in a horizontal position; but if the handle is not held it will drop down into a vertical position, and its inner end will bear upon the projection u^3 and raise the pawl out of the notch, when the switch-post will be free to turn by the action of the spring.

Constructed as above described and shown, the operation of our improved switch is as follows: As the switch-handle is thrown around from the position shown in the figures, the switch-shaft is turned, and the crank f^2 operates the cam-block and switch-rod, thus forcing the switch open. At the same time the rock-arm t draws upon the chain s^3, and the lever s' thus slides the rod R lengthwise and lifts the weighted ends of the series of levers l' by means of the chains r', thereby depressing the tread-plate l to the level of the track-rail. This motion of the lever also releases the lock-block k', which is then pulled in toward the switch-rod i^2 by means of the weight k^6. As hereinbefore explained, the crank f^2 travels for a short distance after the switch is thrown open and while the cam i remains stationary; but the rock-arm t meanwhile travels and operates the lever s', and the weight k^6 therefore draws the lock-block in behind the projection h on the switch-rod, thus securely locking the switch open. The switch will then remain open as long as the lever u' is held horizontal with the pawl in the notch e^2, or while the tread-plate is held depressed by the weight of the car-trucks. As soon, however, as the train passes the tread-plate, the weights n' operate and elevate the tread-plate and actuate the lever s^2, thus drawing the lock-bolt k' and turning the switch-handle u' by means of the chain s^3, whereby the switch-point D is drawn against the rail C and the continuity of the main line restored. The spring u assists in closing the switch, and the spring is also provided for the purpose of closing the switch in case the tread-plate, levers, or chains are broken from any cause.

The chain s^3 can be disconnected and the switch work independently of the tread-plate, levers, weights, and sliding rod. The spring s must be considerably stronger than the spring u, and must yield only when the tread-plate for any reason will not depress. Then the spring will give and allow the switch to be thrown, and then as soon as a train passes onto and depresses the tread-plate the spring will contract. The spring s will also meet any contraction or expansion of the sliding rod R. The opening of the switch raises the weights and permits the tread-plate to lower, and the switch therefore will be held open until the train is actually on the tread-plate, after which it remains open until the train clears the plate. Therefore, to relieve the switchman from resisting the action of the weights and the spring during the interval before the train strikes the tread-plate, we provide the pivoted pawl e' and the locking-notch e^2 in the switch-stand, so that as the switch is opened the pawl falls into the notch and holds the mechanism. It is then only necessary for the switchman to hold the switch-handle till the train is on the plate. After this, however, the handle may be released, and as its outer and heavier end drops down in a vertical position its inner end engages the projection u^3 on the pawl and draws the pawl from the locking-notch, and the switch is then free to close as soon as the train leaves the plate. As the tread-plate is depressed by the switchman and not by the train, it is not subject to violent shocks by engagement with the forward trucks and consequent splintering and wear, and the mechanism of the switch is not subject to derangement and breakage by violent blows and jars.

We claim as new and desire to secure by Letters Patent—

1. In automatic railway-switches, the combination, with the main line, switch, and siding or branch line, of the switch-stand, shaft,

and connecting-rod for moving the switch, the tread-plate and counterweighted levers supporting it, the sliding rod and connections attached to the weighted ends of the levers, the switch-crank and connections for operating the sliding rod and tread-plate, a locking-bolt adapted to engage the switch-rod to lock the switch open, and counter-weight for actuating the bolt as the switch is thrown open and the tread-plate is drawn down, and the connections for disengaging the bolt by the action of the tread-plate weights, whereby the bolt is drawn and the switch and main line are automatically restored as the train clears the tread-plate, substantially as described.

2. In automatic railway-switches, the combination of the switch-stand F, provided with a notch, e^2, in the edge of its upper face, the arm u^2, secured to the switch-shaft located eccentrically with relation to the notched stand, the handle u', pivoted in the end of the arm, the pawl e', pivoted to the arm interior to the handle and adapted to drop into the notch as the switch is opened, and provided with a projection, u^3, extending over the inner end of the switch-handle, whereby the pawl is disengaged from the locking-notch as the switch-handle assumes a vertical position, substantially in the manner and for the purpose specified.

3. The combination, with the main line, switch, and siding, of the switch-stand F, the shaft f', actuating-spring u, switch-crank f^2, cam g, and connecting-rod i^2, provided with the projection h, the tread-plate l, the fulcrums n, lever l', supporting the tread-plate, counter-weights n', for raising the tread-plate and closing the switch, the sliding rod R, the hooks r^2, the connecting-chains r', attached to the hooks and the weighted ends of the levers, the chain-pulleys p p' and their bearings p^3, the lever s', the spring s, connecting the sliding rod and the lever s', the switch-crank t, secured upon the switch-shaft, the chain s^3, connecting the crank t and lever s', the pulley s^4 and its support s^5, the locking-plate k, through which the switch-rod passes, the locking-bolt k', guided in the plate and adapted to engage the projection on the rod to lock the switch open, the weight k^6, and connecting-chain k^4, for locking the bolt, the pulley k^5, guiding the chain, the chain k^2, connecting the lock-bolt to the lever s', and a switch lever or handle secured to the shaft for opening the same, all combined and arranged substantially in the manner and for the purpose specified.

4. In railway-switch mechanism, the combination, with the shaft, switch-crank f^2, and connecting-rod, of the cam-block i, secured at the end of the rod and engaged by the switch-crank, and provided with a cam-slot, g, so shaped that when the switch is thrown open the slot is continued for a distance in the path of the crank for the purpose of permitting the further motion of the crank t, switch-shaft, and connections to raise the tread-plate lever-weights and allow the tread-plate to lower, and also permit the locking-bolt r' to engage the notch h and lock the switch open, substantially in the manner and for the purpose specified.

5. In automatic railway-switches, the combination, with the main line, switch, and siding, of the switch-stand, shaft, and connecting-rod for moving the switch, the tread-plate and counterweighted levers and connections attached to the weighted ends of the levers, the switch-crank and connections for operating the sliding rod and tread-plate, and a spring or elastic connection interposed between the connections uniting the switch-crank and sliding rod, a spring coiled upon the switch-shaft and adapted to throw the shaft to operate the switch, a locking-bolt adapted to engage the switch-rod to lock the switch, the counter-weight for locking the bolt, and the connections for unlocking the bolt by the action of the tread-plate weights, whereby the lock-bolt is drawn and the switch operated, substantially in the manner described.

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