(No Model.) 2 Sheets—Sheet 1.

W. C. AYERS.

RAILWAY SWITCH.

No. 603,372. Patented May 3, 1898.

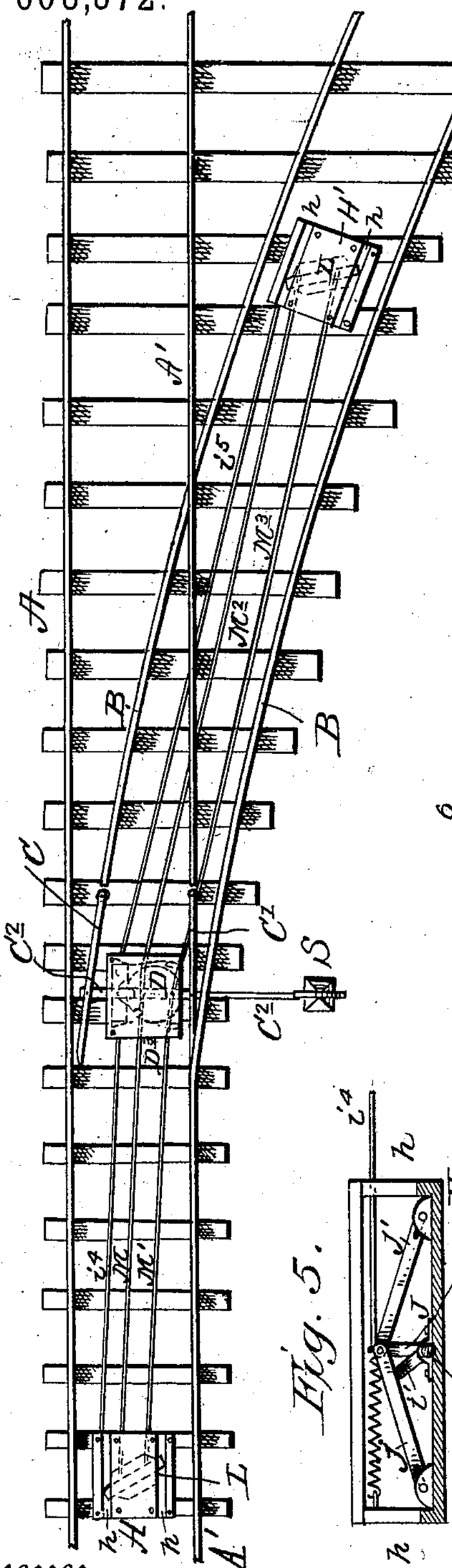

Fig. 1.

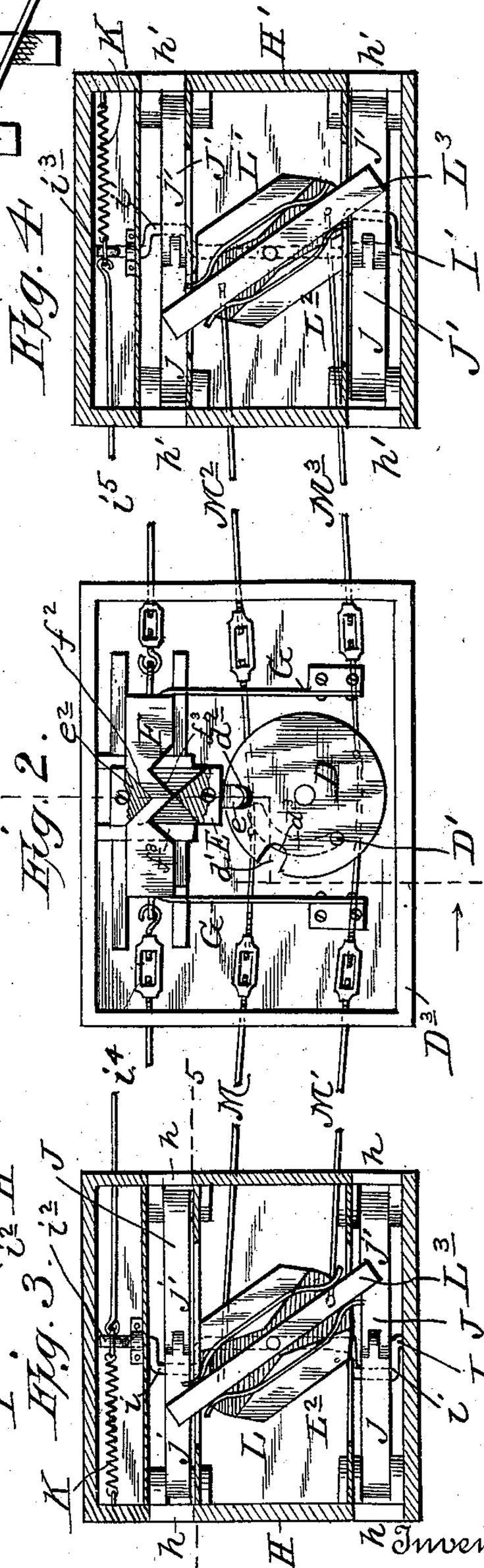

Fig. 4.

Fig. 2.

Fig. 5.

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

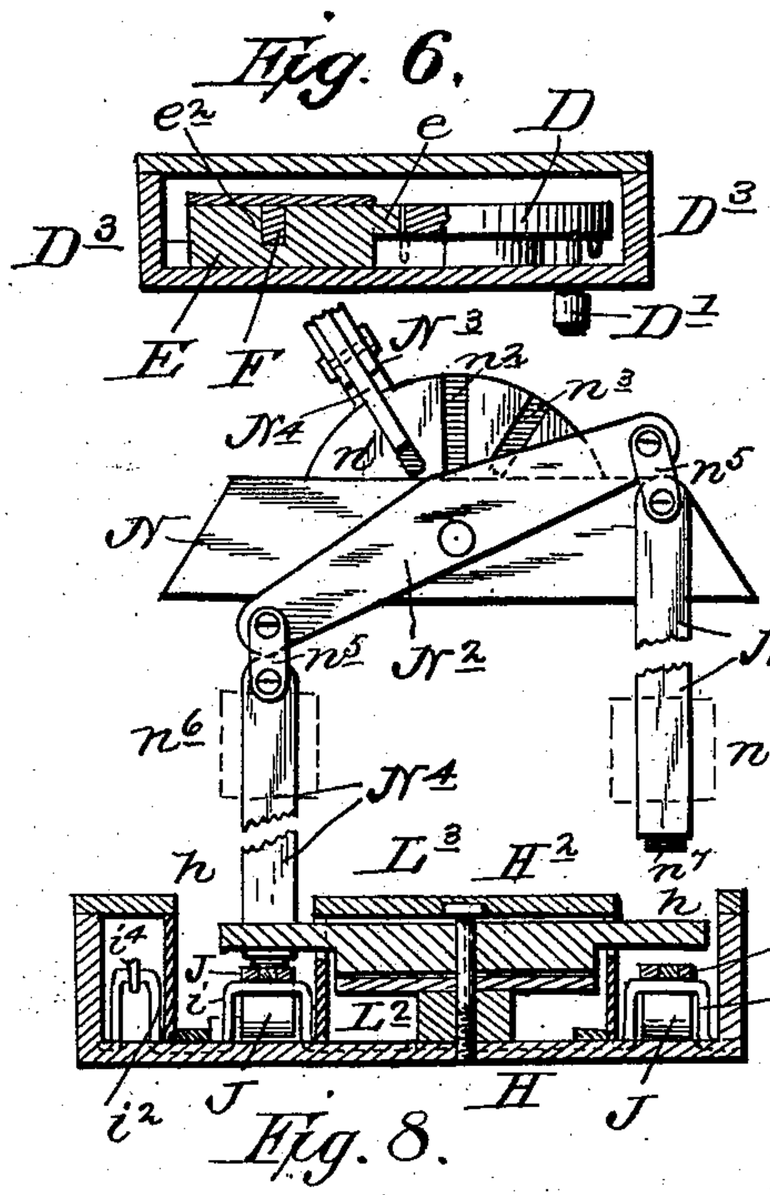


Fig. 8.

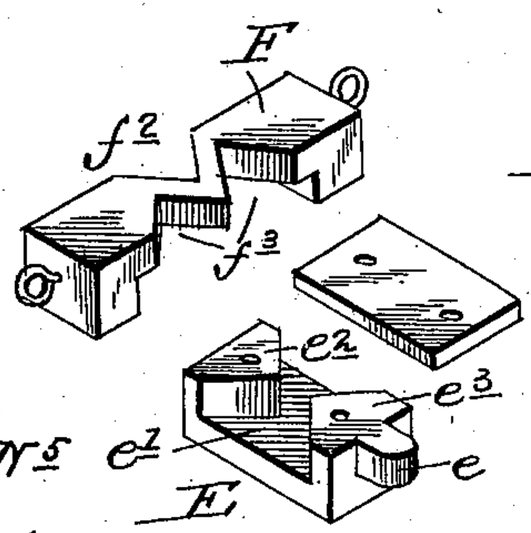


Fig. 7.

Fig. 9.

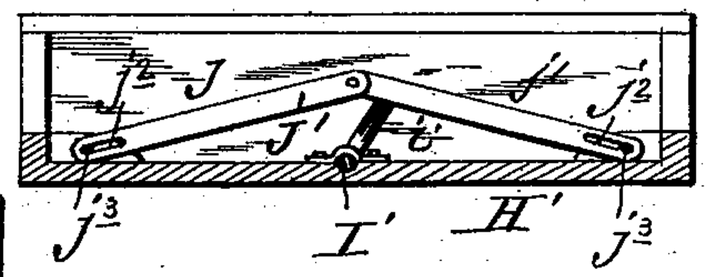


Fig. 11.

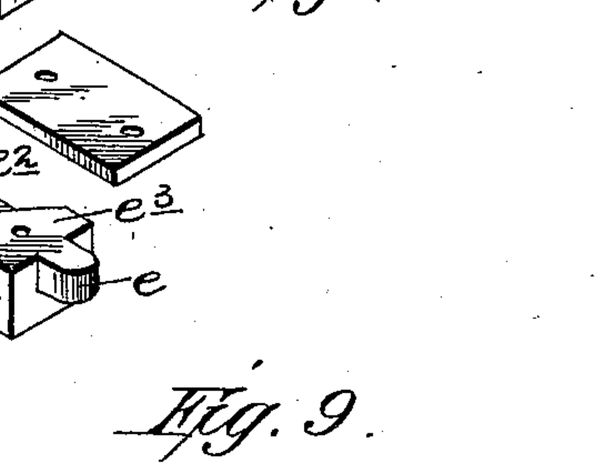


Fig. 10.

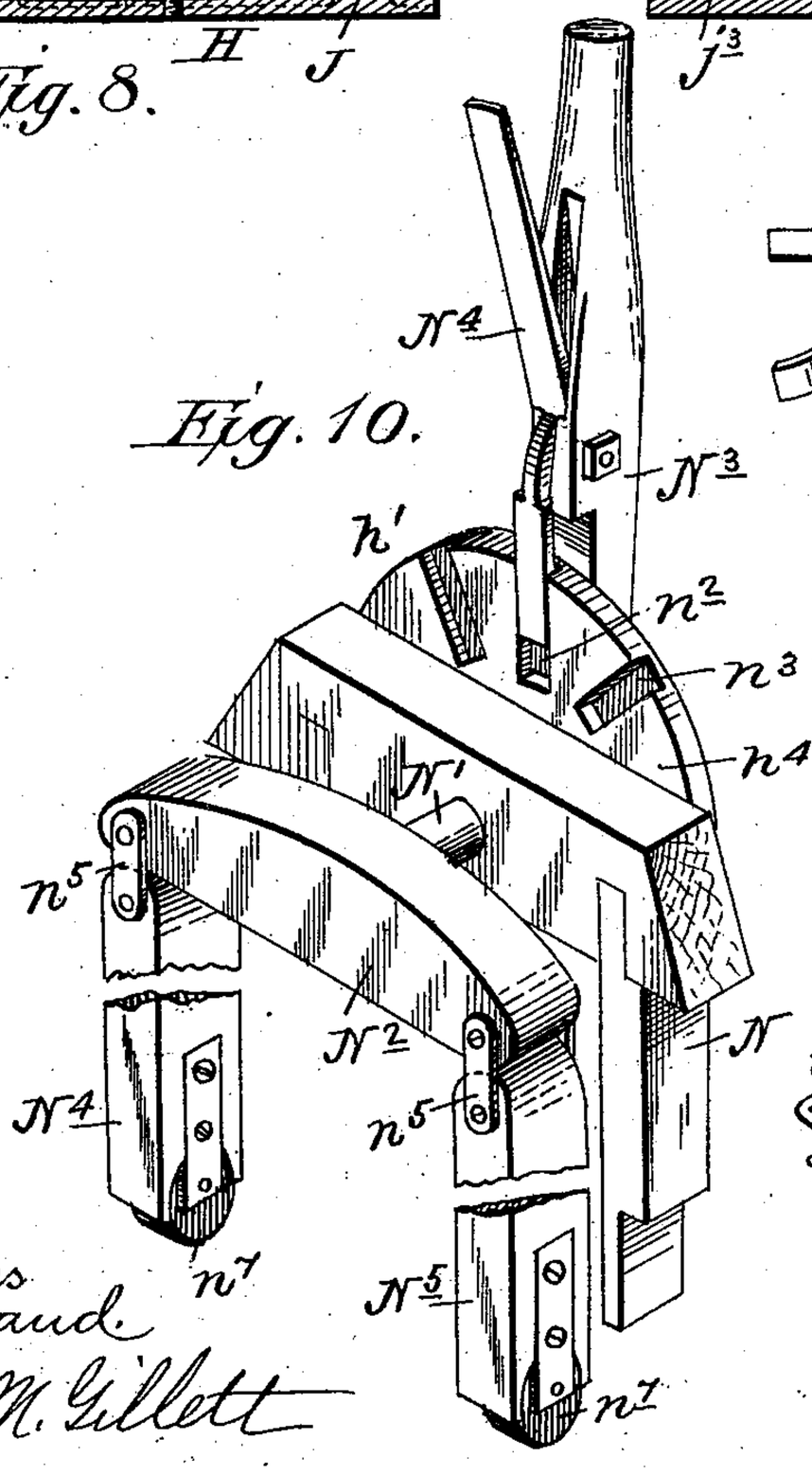
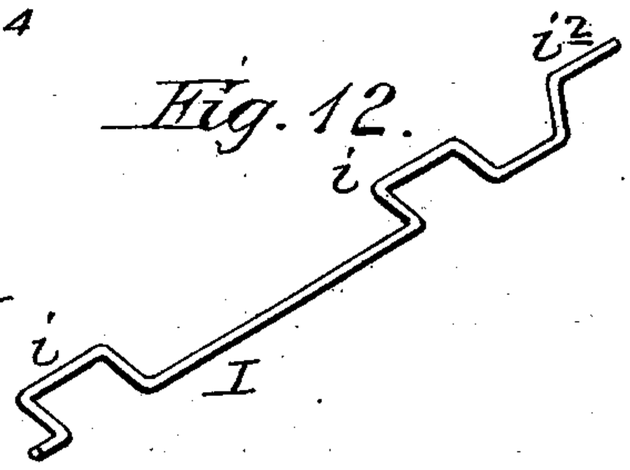


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM C. AYERS, OF PLYMOUTH, NORTH CAROLINA.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 603,372, dated May 3, 1898.

Application filed September 9, 1897. Serial No. 651,092. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. AYERS, a citizen of the United States, residing at Plymouth, in the county of Washington and State of North Carolina, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification.

The invention relates to the class of switches operated from the locomotive.

The objects of the invention are to provide a simple and effective train-operated switch in which the switch-operating rods carried by the locomotive will first operate to retract a locking mechanism to release the switch-operating mechanism and then in turn actuate the switch-operating mechanism to open the switch for the passage of a train from the main line to a siding, one of the switch-operating rods then serving to restore the switch-operating mechanism to its normal closed position, where it will be again automatically locked by the said locking mechanism; to provide an effective double-acting locking mechanism, and to provide an improved form of levers for engagement by the switch-operating rods. These objects I accomplish by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of a portion of a railway-track with my improved switch mechanism applied. Fig. 2 is a plan of the locking mechanism, the switch-operating disk or segment, and the middle box containing the same, the box-cover being removed. Fig. 3 is a similar view of the left-hand box containing the lock-operating levers and the duplex lever for operating the switch-operating disk. Fig. 4 is a similar view of the right-hand box and the mechanism contained therein. Fig. 5 is a detail sectional view on line 5 5, Fig. 3, the partition being removed. Fig. 6 is a similar view on line 6 6, Fig. 2. Fig. 7 is a perspective view of the locking-bolt and its operating cam-slide separated and removed from the box. Fig. 8 is a transverse section through the left-hand box, the train mechanism being shown in front elevation with one rod depressed to operate the lock-releasing and disk-operating levers. Fig. 9 is a view similar to Fig. 5. Fig. 10 is a perspective of the train-lever and its depending operating rods or bars for unlocking and operating the switch mechanism. Fig. 11 shows the several parts of one of the levers for operating the switch-throwing disk. Fig. 12 is a perspective of one of the cam-operating rock-shafts.

A A′ are the main rails, and B B′ are the siding-rails.

C C′ are the movable rail-sections forming the switch and connected for simultaneous operation by the track-rod C^2. The rail-section C′ forms a continuation of the main rails A′, and the section C forms a continuation of the siding-rail B, so that when the parts are in the position shown in Fig. 3 the main line is open for travel thereover; but when the rail-section C′ is moved away from main rail A′ and the rail-section C is moved against main rail A the train will be free to run from the main line upon the siding, or vice versa.

The track-rod C^2 is operated by the horizontal pivoted disk D, to which it is connected by a pin D′, extending down through a curved slot d^3 in the bottom of the box D^3. The periphery of this switch-operating disk is provided with two notches d' d^2, into which is adapted to shoot the nose e of the transversely-sliding bolt E, as shown in Fig. 2. The bolt E is slotted transversely, as at e', and the end walls of the slot are in the form of V-shape lugs e^2 e^3.

F is the bolt-operating cam-slide, passing through the slot e' and provided on one edge with a V-shape notch b^2, receiving the lug e^2, and on its opposite edge having two shape notches f^3, adapted to alternately receive the bolt-lug e^3. As shown in Fig. 2, the apex of the angle, formed by the converging sides of the recesses f^3, registers with the apex of the lug e^3 and holds the bolt in its locked or shot position. Any pull to the right or left on slide F will cause one or the other wall of slot f^2 to bear on one side of the lug e^2, and thereby retract the bolt. This cam-slide is normally held, as shown in Fig. 2, by means of two powerful springs G G of the form shown or of any other suitable form.

The bolt-operating slide F is operated from either lever-box H H′ by means of transverse crank-shafts I I′, mounted in said boxes, with their operating-cranks i i' oppositely placed, as shown in Figs. 3 and 4, and with their transmitting-cranks i^2 i^3 connected to the

ends of the bolt-operating slide F by means of rods i^4 i^5, provided with turnbuckles for adjusting them.

There are two operating-cranks i i and i' i', and they are within longitudinally-extending channels or troughs h h h' h', formed in the boxes H H', respectively, where they are crossed by the vertically-operating levers J J', four in number, or one for every operating-crank i i i' i'. These levers J J' are each formed of two members j j', pivoted together at their adjacent higher ends and provided at their opposite ends with longitudinal slots j^2, through which pivot-pins j^3 are passed. (See Figs. 5 and 9.)

K K are spiral springs connecting the transmitting-cranks i^2 i^3 to the interior of boxes H H' at points opposite to where the rods i^4 i^5 enter, and they serve to hold the crank-shafts I I' in proper working positions by always restoring them to their normal positions after operation by levers J J'.

The boxes H H' are provided with covers H^2, which inclose their tops, except at the channels or troughs h h, which are entirely open from end to end for the operating-rods carried by the locomotive and to be presently described.

The boxes H H' are further provided with centrally-pivoted horizontal sectional levers L L', each comprising a transmitting member L^2, provided with a longitudinal slot l^2, having flaring ends, and an operating member L^3, extending through said slot and projecting at its ends into the two channels h h or h' h', respectively. (See Figs. 3, 4, and 8.) The lever member L^3 is held centered within the slot l^2 by means of a pair of parallel plate-springs l^4, secured at their middle portions in slots l^5 and at their ends bowed inwardly and engaging the member L^3.

The lever members L^2 of each lever are connected at opposite sides of their pivots to the switch-throwing disk D at opposite sides of its pivots by means of pairs of rods M M' M^2 M^3, so that when either lever L or L' is turned its movement will be transmitted to the disk D for throwing the switch through rod C^2. The part D is here called a "disk" merely as a convenience, since it is a lever in its functions and is intended to include a lever.

The boxes H H' are in practice placed several hundred feet from the switch and the box D^3 is placed between the switch-rail.

The mechanism for operating the levers in boxes H H' is shown in Figs. 8 and 10 and comprises a suitable bracket N, mounted transversely within the locomotive-cab and forming a bearing for a rock-shaft N', extending longitudinally of the cab and provided at one end with a cross-head N^2 and at its opposite end with a vertically-extending hand-lever N^3, provided with a latch N^4, adapted to engage any one of three notches n' n^2 n^3 in plate n^4, and thereby lock the lever in its adjusted position.

N^4 N^5 are the rods for operating the levers in boxes H H' and are suspended at their upper ends by links n^5 from the ends of the cross-head N^2, so as to be alternately raised and lowered thereby. These rods or bars N^4 N^5, which for convenience may be termed "train rods or bars," pass down through guides n^6 n^6 and are of a length to contact at their lower ends with the levers in boxes H H', said lower ends being preferably provided with rollers n^7 n^7.

The operation is as follows: Suppose the parts to be in the position shown in Figs. 1, 2, 3, 4, and 10 and a train is passing from left to right. If the engineer desires to take the siding, he simply throws the hand-lever N^3 to the left, (see Fig. 8,) which will depress the left-hand rod or bar N far enough to insure its entering the left-hand channel h, where its roller n^7 will first depress the lever J, which will depress crank i, and thereby rock the shaft I to the left. This will cause crank i^2 to pull rod i^4 to the left, and the rod will therefore slide the cam F to the left, which will move the bolt E out of engagement with disk D. The rod N^4 will now have struck the left-hand end of member L^3 of lever L, which will have caused its rod M' to pull on the unlocked disk D. The disk D in rotating will have moved to the right, and its pin D' will have therefore traveled toward the bolt E, and thus have thrown the switch-rod C^2, so as to move the switch-rail sections C C'. The rotation of the switch-throwing disk D, as just described, will bring its notch d' opposite the nose e of the bolt E, which will snap into it by reason of the springs G G restoring the slide F to its normal position immediately upon the passage of the rod N^4 out of contact with lever J. It will be seen that when rod N^4 strikes the lever member L^3 it will press it entirely out of the channel h; but owing to its springs said member will immediately snap back into the channel. Thus the ends of the members L^3 will always be held in an operative position.

The above-described operation of the disk D will have reversed the position of the right-hand lever L', and after the train has passed onto the siding the engineer will throw the lever N^3 to the right, which will depress the rod or bar N^5, so that it will enter the right-hand channel h' of box H' and first operate lever J' to rock the shaft I' and unlock the disk D through rod i^5, whereupon the rod N^5 will strike lever L' and cause rod M^3 to pull on and rotate disk d to the left, which will pull the switch-rod C^2 and rail-sections C C' to the position shown in Fig. 1. The bolt E will then engage notch d^2 and lock the switch.

As a measure of safety the engineer could always lock the right-hand rod N^5 down, so that if the switch was inadvertently or purposely left open for the siding the said rod will act on the right-hand end of lever L, and thus immediately throw the parts to the position shown in Fig. 1 and prevent the train from running on the siding.

If desired, the rod C^2 may be connected to a target or other signal S, Fig. 1.

What I claim is—

1. The combination with the pivoted switch-throwing disk, of train-operated switch-throwing levers at opposite sides of the switch and connected with said disk for turning it in opposite directions, a bolt for locking the disk, and train-operated bolt-operating levers adjacent to said switch-throwing levers; whereby the disk will first be unlocked and then turned to throw the switch, substantially as set forth.

2. The combination with the pivoted switch-throwing disk, of centrally-pivoted horizontal switch-throwing levers at opposite sides of the switch and connected to the disk for turning it in opposite directions, a bolt for locking said disk, bolt-operating levers under both ends of said switch-throwing levers, crank-shafts under said bolt-operating levers, and rods connecting said crank-shafts with the bolt or locking mechanism, substantially as set forth.

3. The combination with the notched switch-throwing disk, of a bolt for engaging either disk-notch, a cam-slide for operating the bolt from either direction, and springs engaging the ends of the bolt-operating slide and holding it in its normal position, substantially as set forth.

4. The combination with the switch-throwing disk having locking-notches, of the bolt for engaging said notches, and provided with a transverse slot, e', having flaring ends forming V-shape lugs, e^2 e^3, the train-operated slide, F, passed through said slot and having a notch, f^2, receiving lug, e^2, and notches, f^3, for lug, e^3, and springs for holding the slide in its normal position, substantially as set forth.

5. In a train-operated switch mechanism, a centrally-pivoted switch-actuating lever formed of a transmitting member having a longitudinal slot, an operating member extending through said slot for operation at either end by the train devices, and springs centering the operating member within the transmitting member, substantially as set forth.

6. The combination with a lever-box having parallel longitudinal channels open from end to end for the passage of the train rods or devices, of a transverse centrally-pivoted two-part lever, the members of which have a yielding or spring connection; the ends of the transmitting-lever member projecting into said channel, a rock-shaft within the box and having cranks within said channels and an end transmitting-crank, and levers formed of two members pivoted together above the said cranks and at their ends pivoted in the ends of the box-channels, substantially as set forth.

7. The combination with the box and centrally-pivoted notched switch-throwing disk, D, having a pin, D′, extending through a curved slot in the box-bottom, of a bolt, E, for engaging the disk-notches, and a longitudinal bolt-operating slide, F, having springs bearing on its ends, substantially as set forth.

8. The combination with the rock-shaft having a hand-lever and cross-head, means for locking said lever, and rods depending from the ends of the cross-head and extending down adjacent to the road-bed, of a switch-throwing disk provided with a locking mechanism, lever-boxes beyond and at opposite sides of the switch-operating disk, and each having a pair of parallel channels for the lower ends of said rods, centrally-pivoted levers in the lever-boxes with their ends projecting into said channels, rods connecting the levers at opposite sides of their pivots with the disk at opposite sides of its pivot, longitudinally-extending lock-operating levers within the said channels, crank-shafts having an operating-crank under every lock-operating lever, and a transmitting-crank connected to the ends of the lock or bolt operating device, substantially as set forth.

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