

I. A. CALL.
SAFETY RAILWAY SWITCH.
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995,950.

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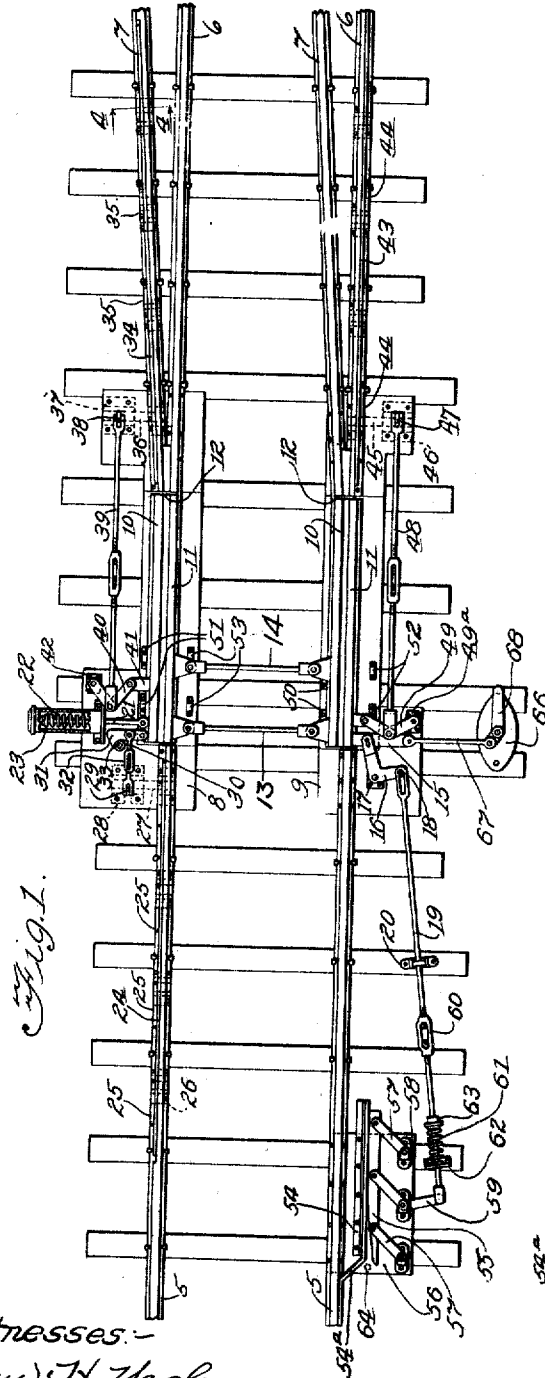


Fig. 1.

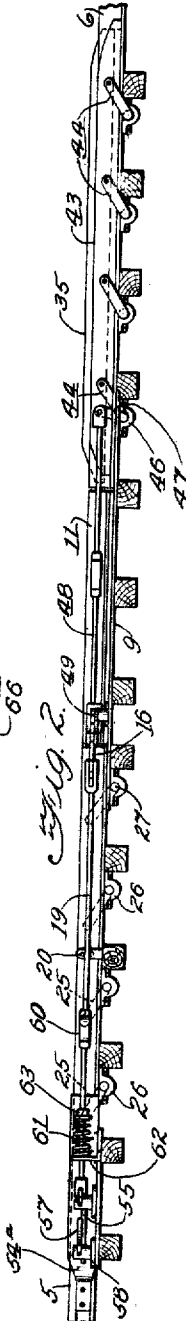


Fig. 2.



Fig. 3.



Fig. 4.

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SAFETY RAILWAY-SWITCH.

995,950

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To all whom it may concern:

Be it known that I, IRA A. CALL, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Safety Railway-Switches, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to improvements in safety railway switches of that type wherein means are provided for preventing the switch from changing its position while the train is passing thereover, which would result in part of the train passing along the main track and the rest of the train passing into the siding.

Heretofore in devices of this class, so far as I am aware, when the switch is thrown to such a position that the train is caused to run out upon the siding no effective means have been provided for holding the movable rails against side thrusts. As is well known, when a moving train is turned from a straight track into a siding or other curved portion of track the tendency of the train to continue in a straight line causes the flanges on the wheels of one side of the train to engage the inner side of the head of the rail and tend to force this rail out of its proper position. It is common practice to have the main track rails which approach the switch terminate in stub rails made movable in order that they may be alined either with the main track beyond the switch or with the siding track. If in such a case stops be provided, to which the stub rails are moved, the tendency of the train, when the switch is thrown to the siding, is to move the rails to main line position, that is, to such a position that the train may proceed in a straight line.

It is, therefore, one of the objects of my invention to provide a form of railway switch in which the tendency of the moving train, when the switch is set so that the train may take the siding, will be to move the stub rails into closer engagement with the stops rather than to move them away from said stops. This results in greater safety, as is clearly evident.

Another object of the invention is to provide a switch in which a continuous link extends from the fixed or immovable part of

the main track in front of the switch to the immovable rails beyond the switch in order that the rails in front of and beyond the switch may neither work toward each other nor away from each other, the movable stub rails being therefore insured freedom of action and the reliability of the device as a whole being increased. This link also insures the proper alinement of track rails and the switch rails, as sidewise or other movement of one part of the device cannot occur unless the device as a whole moves over bodily.

Another object of the invention is to provide a switch in which the movable stub rails rest upon and work over a rigid bed, on which bed are fulcrumed or otherwise supported the various moving levers and the like which are employed in the mechanism of the device, whereby shifting of the track due to expansion and contraction of the rails or other causes may not disarrange the switch.

A still further object is to provide a switch in which a train proceeding from the trailing side thereof, either upon the main line track or the siding, will automatically throw the switch to such a position that the train may proceed out upon the main line rails at the facing side of the switch, it being unnecessary that the switch be thrown by hand to permit the train to run from the trailing side thereof to the facing side.

A still further object is to provide means whereby if the switch be thrown only partially to the siding position the track which the first truck of the train takes will determine which track will be taken by the following trucks. If the first truck takes the siding the switch will be thrown completely over to siding position, or if, on the other hand, the first truck of the train takes the main line rails, the switch will be thrown completely to main line position in order that the rest of the train may follow the first truck.

Other objects and advantages will appear in the following specification and claims, taken in connection with the accompanying drawings in which—

Figure 1 is a plan view of the device. Fig. 2 is a side elevational view of the same. Fig. 3 is a longitudinal sectional view of a supporting plate with the stub rails and the ends of the other rails in position thereon. This plate forms the link which extends

from one side of the switch to the other; and Fig. 4 is a cross-section on the line 4-4 of Fig. 1.

The main track rails approaching the switch from one side are indicated 5, 5 while the main track rails on the trailing side of the switch are indicated 6, 6. The siding rails are indicated 7, 7. The rails 5, 5 extend to and rest upon a pair of plates 8 and 9, which plates extend forward to and under the siding rails 7, 7 and main track rails 6, 6 on the trailing side of the switch. The rails 6, 6 and 7, 7 as well as the rails 5, 5 are bolted to the plates 8 and 9 so that it is impossible for the rails on either the approaching or trailing side of the switch to move longitudinally and thus shorten the space between the end of these rails. Extending from each rail 5 to the corresponding rails 6 and 7 is a structure comprising a pair of movable rails 10 and 11. Each pair of rails 10 and 11 is preferably made as a single piece, but may evidently consist of separate rails bolted together side by side. This structure is connected, at the trailing side of the switch, as at 12, to the rails 6 and 7, so that rail 10 forms a continuation of rail 7 and rail 11 constitutes a continuation of rail 6. The movable ends of the two pairs of stub rails are connected together in proper spaced relation by tie rods 13 and 14 and slide over the plates 8 and 9, either the rails 10, 10 or the rails 11, 11 being brought into alinement with the rails 5 as desired.

Extending from one side of the stub rail 11 on the right-hand side of the track is a lug 15 to which is connected by a slot-and-pin connection an elbow lever 16 which is fulcrumed on a plate 17 riveted to the plate 9. The opposite end of the lever 16 is provided with a pin 18 to which is connected with a lost-motion connection a pull rod 19 which extends back along the right-hand side of the track to an automatic trip device which is adapted to be engaged by suitable means carried by the locomotive or first car of a train when it is desired to operate the switch from the train rather than from a tower or the like. This rod 19 is supported between its ends in a suitable slide bearing carried by a bracket 20 which is secured to a tie. If a pull be exerted upon the rod 19 the elbow lever 16 is swung on its pivot and draws the movable ends of the tracks 10 and 11 over into the position in which the rails 10 are brought into alinement with the rails 5, the rails 5 being thereby made continuous with the siding rails 7.

Secured to the outside of the rail 10 on the opposite or left-hand side of the track is a rod or bolt 21, surrounding which is a coiled spring 22 inclosed in a suitable housing 23 and arranged to be compressed by the moving of the stub rails to siding posi-

tion or the position which makes the siding rails continuous with the rails 5. This spring tends, therefore, to restore the switch to normal or main line position.

Extending along the outer side of the left-hand main line rail 5 is a detector bar or side rail 24. This detector bar is carried by a series of links 25, each of which is pivoted at its lower end to a bracket 26 secured to the under side of the rail and at its upper end to the detector bar. This bar normally lies with its upper edge even with the top of the rail, but when moved forward it rises so that its upper edge projects somewhat above the rail. Secured to one of the links 25 is a rock-shaft 27 which extends laterally and is supported at its outer end in a suitable bracket 28 secured to the under side of the plate 8. Fast on this shaft is an arm 29 which projects upward through an opening in the plate 8 and is connected to a rod 30 which leads to a swinging cam plate 31 and is provided with a turn buckle 32, whereby its length may be adjusted. The cam plate 31 is secured to the side of the rail 10 and bears upon a roller 33 which is journaled on a pin extending upward from the plate 8. The cam plate 31 has its roller-engaging surfaces so formed that when the switch is thrown from one position to the other the movable end of the cam plate is caused to swing in such a direction as to pull the rod 30 forward and thus raise the detector bar 24. After the highest part of the cam passes the roller 33 the bar falls to normal position and remains in this position until the switch is again shifted, whereupon the detector bar is first raised and then lowered with the point of the cam on the other side of the roller.

If a train approaching on the rails 5 has thrown the switch to the siding position, or if the switch has been thrown from a tower or the like, as soon as the front truck of the locomotive passes upon the detector bar 24 the latter is held down by the train and the switch is prevented from being returned to main line position, either by the spring 22 or any other means, until the last truck of the last car has passed into the siding. The detector bar is, in practice, made long enough so that after the first truck of the train has passed upon the detector bar a truck will always be upon the bar until the last truck of the train has passed off the rails 5, 5.

A second detector bar 34 extends along the outer side of the left hand siding rail 7, this detector bar being carried by links 35 similar to the links 25. A rock-shaft 36 extends from this detector bar to a bearing plate 37 arranged below the plate 8. An arm 38 is secured to this shaft and extends up through an opening in the plate 8. A rod 39 connects this arm 38 with a knuckle

40. one end of the knuckle being secured to a lug 41 on the rail 10, while the opposite end is secured to a plate 42 which is bolted to the plate 8. The moving of the switch to the siding position partly straightens the knuckle 40 and thrusts the rod 39 forward, thus permitting the detector bar 34 to drop. After the first truck of the train which is passing onto the siding reaches the detector bar 34 the switch cannot shift to the main line position until the last truck of the train has passed off the detector bar 34. After the last truck has thus passed off the detector bar 34 the detector bar is permitted to rise and the knuckle 40 is thus permitted to bend to the position shown in Fig. 1, the spring 22 moving the switch to normal or main line position.

If a train is on the siding and desires to run out upon the main track it is not necessary that the switch be thrown by hand, as the passage of the train upon the detector bar 34 automatically throws the switch to siding position. As before stated the detector bar is normally raised above the level of the rail 7. When the train coming out of the siding passes upon the detector bar the latter is depressed, thus drawing the rod 39 forward and straightening the knuckle 40. This throws the switch over to siding position against the tendency of the spring 22 to hold the same in main line position. After the last truck of the train has left the detector bar 34 the switch cannot be thrown to main line position by the spring 22 while the last truck is still upon the stub rails because one or more trucks are at this time upon the rails 5, 5 and are holding down the detector bar 24 and locking the stub rails stationary. After the last truck has passed off the detector bar 24 this detector bar is permitted to rise and allows the switch to shift to main line position, the detector bar then falling again to its lower position.

A third detector bar 43 is arranged at the right-hand side of the right-hand main line rail 6, this detector bar being carried by links 44 in a manner similar to the detector bars already described. A rock shaft 45, journaled in a bearing plate 46 secured to the under side of the plate 9, has an arm 47 extending upward therefrom and connected by means of a rod 48 with a knuckle 49. This knuckle is secured at one of its ends to a plate 49* which is bolted to the plate 9, its opposite end being connected to a lug on the right-hand rail 11. Normally the detector bar 43 is in its lower position with the upper edge thereof even with the top of the rail. When the switch is thrown to the siding position the knuckle 49 is caused to bend, thus drawing on the pull rod 48 and moving the arm 47 and raising the detector bar 43. If, for any reason, such as the partial clogging of the switch by accumulations of snow or

dirt, the switch should be only partially moved, the first truck of a train trailing the switch would encounter the detector bar 43 and would restore the switch to main line position and thus avoid the danger of the train running off the stub rails and falling upon the ground.

Secured to the plate 8, inside the left-hand main track stub rail 11, are suitable stops 50, which may consist of short bars riveted to the plate 8. Similar stops 51 are secured to the plate 8 outside the right-hand main track stub rail. When the switch is thrown to the siding position these stops determine the movement of the stub rails and also serve to hold the stub rails from being forced over too far by the flanges on the wheels of a train passing into the siding, which would permit the wheels to drop off the rails 5 down upon the road bed. It will be seen that the tendency of the train to move in a straight line is utilized to hold the switch in siding position while the train is passing into the siding. Also it will be observed that when the train is passing out of the siding to the main line the inertia of the train, or the tendency thereof to continue in a straight line, holds the switch against the stops. In switches of older forms the tendency of the moving train is to throw the switch to main line position, this being objectionable for the reason that the mechanism which moves the switch must be depended upon, rather than any positive stops, to hold the switch rails stationary. If the rails of the switch are permitted to move while the train is passing thereover disastrous results may of course ensue. Other stops 52 and 53 limit the movement of the switch when moved to the open or main line position.

Although the switch forming the subject of my present invention may be operated from a tower, and is well adapted for use in this way, I provide, in some cases, means for operating the same from the locomotive or head car of a train. In such a case a suitable throw-over device is located at a point, preferably at one side of the track, where it may be engaged by suitable tripping means located upon the locomotive or head car and adapted to be manually thrown into operative position from the driver's cab. This tripping means which is carried by the car or locomotive may comprise a bar 64 arranged to slide vertically and, when depressed, to pass in between a stationary plate 54 and a movable bar 55 on the throw-over device. This device is so located as to be operated by the tripping bar 64 shortly before the train reaches the detector bar 24. The plate 54 is bolted to a base plate 56 which is secured to the base of the rail 5, while the bar 55 is carried by a series of links 57 which are

pivoted at one end of each to the bar 55 and at their opposite ends to suitable brackets 58 which are bolted to the base plate 56. One of the links 57 has an arm 59 extending therefrom, and to the outer end of this arm is connected the rod 19 through which the switch is thrown. A turn buckle 60 is arranged in the rod 19 so that the rod may be shortened or lengthened as required in adjustment. A spring 61 is coiled around the rod 19 and is seated at one end against a bracket 62 which may be bolted to a tie, while the opposite end of the spring thrusts against a collar or the like 63 on the rod. In order that the trip bar 64 which is carried by the locomotive may be guided in between the plate 54 and bar 55 the plate is provided with an inclined guide strip 54^a and the front end of the bar is tapered. When the trip bar 64 passes in between the plate 54 and bar 55 of the throw-over device the bar 55 is caused to move away from the plate 54, this movement being transmitted through the arm 59 to the rod 19, which latter moves the elbow lever 16 on its pivot, thus throwing the switch to the siding position. Immediately thereafter the front truck of the train passes upon the detector bar 24, this taking place before the trip rod 64 has passed out from between the bar 55 and the plate 54. The weight of the train upon the detector bar 24, as above explained, locks the switch in whichever position it is in when the train passes upon the detector bar. The switch having been thrown to siding position and the train having passed upon the detector bar 24 before the trip mechanism is released, it is evident that the switch must remain in siding position as long as the train is passing over the detector bar 24. The switch cannot be shifted to main line position until the last car has not only passed over the detector bar 24 but also passed over the stub rails and the detector bar 34.

If a train should approach the switch on the rails 6, 6 and for any reason, such as the failure of the spring 22 to move the switch to main line position, the switch should be in the siding position or between the main line and siding positions, the weight of the train upon the detector bar 24 will cause the switch to be thrown to the main line position as hereinbefore explained.

A source of frequent trouble with switches has heretofore been the tendency of the rails which approach the switch from each side to creep along the ties, due to the traffic thereover. Another cause of trouble has been the expansion and contraction of the rails at each side of the switch due to temperature changes. Where the levers and other movable parts are secured or connected to the ties the ties have shifted and thrown

the parts out of alinement or out of operative position sufficiently to disarrange the whole device, frequent accidents having occurred from this cause. It will be noted that in the switch of my present invention the movable rails work over plates which extend from the stationary rails at one side of the switch to the stationary rails at the other side of the switch, these stationary rails and plates being securely bolted together so that if the stationary rails should creep or shift laterally the plates must move with the rails. Furthermore, the number of levers, toggles and the like required is small for this type of switch and these are carried by and fulcrumed or otherwise supported upon the plates 8 and 9. It will thus be seen that if the rails 5, 6 and 7 creep or shift the whole switch, including the operating mechanism therefor, will move together, the device as a whole remaining in operative condition and the rails having their ends properly alined with each other at all times. In order to effectually resist the tendency of the rails 5 to creep toward the rails 6 and 7, or vice versa, shoulders are formed on the plates 8 and 9 by thickening the portion 65 upon which rest the movable rails 10 and 11, the rails 5, 6 and 7 resting upon the thinner portions at the ends of the plates and abutting these shoulders.

If desired an ordinary hand switch stand 66 may be provided for manually throwing the switch. The actuating rod 67 of the switch stand is connected to the lug 15 and transmits movement from an operating arm or lever 68 to the movable rails of the switch. As the connection between the main operating rod 19 and the operating elbow lever 16 is a lost-motion connection this may be done without interference on the part of the throw-over device. Where the switch is intended to be operated exclusively from a tower the hand switch stand and the throw-over device will not be installed, but when it is intended to operate the switch mainly from the train the hand switch stand will be provided in addition to the throw-over device in order to obviate the necessity of equipping every car or locomotive with the tripping means.

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

1. A railway switch comprising a pair of approaching main line rails; a pair of trailing main line rails; a pair of siding rails; two pairs of stub rails, one pair of stub rails being permanently alined with said siding rails, and the other pair of stub rails being permanently alined with said trailing main line rails, and said pairs of stub rails being movable to make connection between said siding rails and said approaching main line rails or between said trailing main line rails

and said approaching main line rails; a stop for limiting the movement of said stub rails when moved toward the siding position whereby such stop takes the impact of the train in entering the siding, said stop being rigidly connected to one of said approaching main line rails; and automatic mechanism for effecting the movement of said stub rails, said automatic mechanism being rigidly connected to one of said approaching main line rails.

2. A railway switch comprising a pair of approaching main line rails; a pair of trailing main line rails; a pair of siding rails; two pairs of stub rails; one pair of stub rails being permanently alined with said siding rails, and the other pair of stub rails being permanently alined with said trailing main line rails, and said pairs of stub rails being movable to make connection between said siding rails and said approaching main line rails or between said trailing main line rails and said approaching main line rails; metallic means for supporting said pairs of stub rails and rigidly connecting said approaching and trailing main line rails and said siding rails together; stops for limiting the movement of said stub rails in both directions, said stops being mounted rigidly upon said supporting and connecting means, whereby all of the parts are immovably connected together; and automatic mechanism for effecting the movement of said stub rails, said automatic mechanism being rigidly connected to one of said approaching main line rails.

3. A railway switch comprising a pair of approaching main line rails; a pair of trailing main line rails; a pair of siding rails; two pairs of stub rails, one pair of stub rails being permanently alined with said siding rails, and the other pair of stub rails being permanently alined with said trailing main line rails, and said pairs of stub rails being movable to make connection between said siding rails and said approaching main line rails or between said trailing main line rails and said approaching main line rails; metallic means for supporting said pairs of stub rails and rigidly connecting said approaching and trailing main line rails and said siding rails together; stops for limiting the movement of said stub rails in both directions, said stops being mounted rigidly upon said supporting and connecting means, whereby all of the parts are immovably connected together; and automatic mechanism for effecting the movement of said stub rails, said automatic mechanism having a portion thereof connected to one of said approaching main line rails and having another portion thereof connected to said metallic supporting and connecting means; all as and for the purposes set forth.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

IRA A. CAILL.

Witnesses:

W. L. FARRAR,
CHAS. L. HOPKINS.