May 16, 1944. H. L. BONE 2,348,707

RAILWAY SWITCH OPERATING APPARATUS

Filed Dec. 15, 1942 2 Sheets-Sheet 1

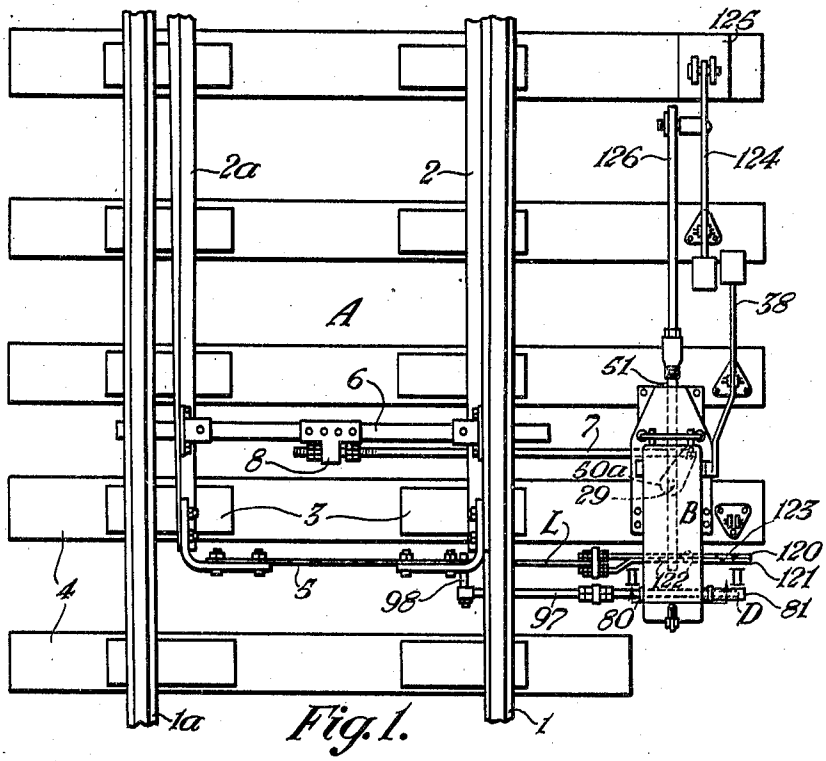


Fig. 1.

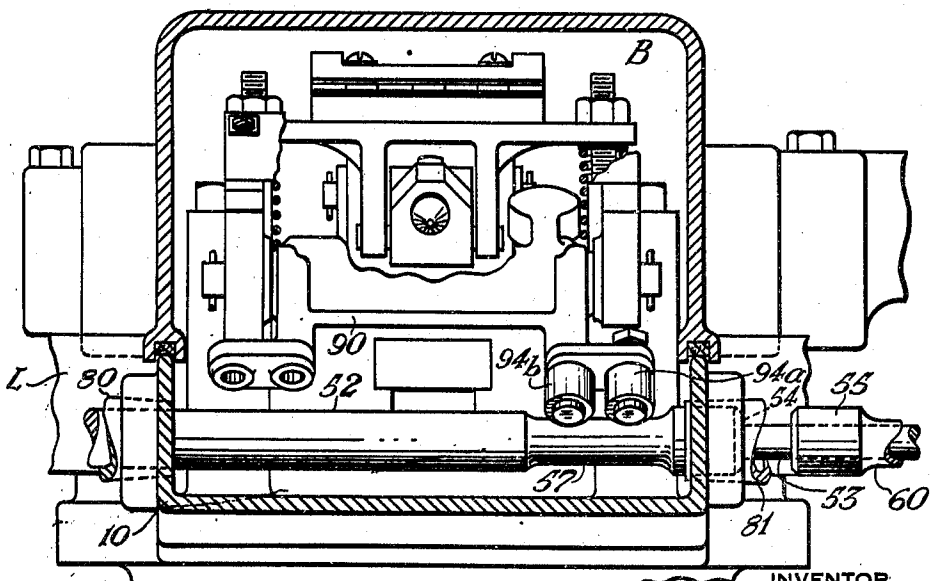


Fig. 2.

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RAILWAY SWITCH OPERATING APPARATUS

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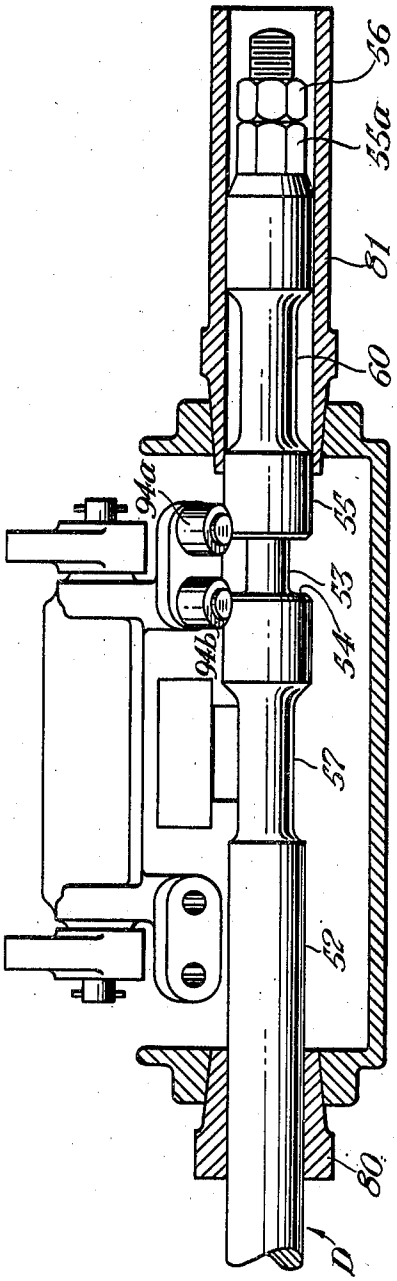


Fig. 5.

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RAILWAY SWITCH OPERATING APPARATUS

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1 Claim. (Cl. 246—253)

My invention relates to railway switch operating apparatus, and particularly to improvements in railway switch operating apparatus of the type shown and described in Letters Patent of the United States No. 2,184,870, granted to myself and Kenneth J. J. McGowan on December 26, 1939.

Switch operating apparatus of the type described in said patent includes a manually operable lever for moving the switch between its two extreme positions, a lock bar controlled by means separate from the switch throwing apparatus and cooperating with a lock rod secured to the switch points for locking the switch in its normal extreme position, a circuit controller the contacts of which are controlled jointly by the lock bar and by a round point detector rod secured to the normally closed point for indicating when the switch is locked in its normal position and the normally closed point is in proper engagement with the associated fixed rail, and latch mechanism effective for retaining the circuit controller contacts in their operated positions if they are moved to their operated positions when the switch is locked due for example to displacement of the closed point by a train trailing the switch.

With the switch operating apparatus constructed in the manner just described the lock bar is provided with a single notch and is so adjusted that this notch will align with the lock bar when and only when the switch occupies its full normal position. In the modernization of old interlocking plants it has recently been proposed to modify apparatus of the type described to enable it to lock the switch points in both their normal and reverse positions and still provide the safeguards commonly provided in railway interlocking practice. This result can readily be accomplished by replacing the old lock rod with a new lock rod having two notches one of which aligns with the lock bar when and only when the switch occupies its normal position and the other of which aligns with the lock bar when and only when the switch occupies its reverse position, and by further connecting the lock bar to a ground lever stand fitted with an electric switch lock controlled by signals governing traffic over the switch, said lock being subjected to time release means to prevent the switch from being thrown directly in the face of an approaching train. This arrangement enables the switch to be unlocked by the separate ground lever, thrown by the hand throw lever, and then relocked in the reverse position by operation of the ground lever.

When the mechanism is modified in this manner, however, it then becomes desirable to render the circuit controller contacts effective to indicate when the switch is properly locked by the lock bar in both extreme positions of the switch, and also to enable the latch mechanism to function in the reverse locked position of the switch in the same manner that it functions in the normal locked position of the switch, and the principal object of my present invention is to provide means for accomplishing these desirable results.

According to my invention the old point detector rod of the mechanism is replaced by a new point detector rod having at one end a portion of reduced diameter upon which a sleeve having the same diameter as the main body portion of the rod is adjustably mounted. The main body portion is provided with a notch for cooperation with a pair of rollers secured to the operating member of the circuit controller and the adjustable sleeve portion is provided with a similar notch. The detector rod as a whole is so adjusted that the notch in the main body portion thereof will align with the rollers secured to said operating member when and only when the switch occupies one extreme position, and said sleeve is so adjusted that the notch therein will align with said rollers when and only when the switch occupies its other extreme position. Sufficient space is provided between the sleeve and the shoulder formed at the junction of the reduced and main body portions of the rod to permit any adjustment of the sleeve necessary to take care of different switch strokes and differences in the stroke of a given switch over a period of time, and the two rollers are spaced apart far enough so that with the maximum spacing between the sleeve and the shoulder it is impossible for the rollers to enter the space between the sleeve and the shoulder. It will be understood, of course, that my invention does not provide selective point detection, it being necessary to employ a separate switch circuit controller for this purpose.

Other objects and characteristic features of my invention will become apparent as the description proceeds.

I shall describe one form of switch operating apparatus embodying my invention, and shall then point out the novel features thereof in claim.

In the accompanying drawings, Fig. 1 is a view showing a railway switch operated by switch operating apparatus provided with point detector and latch mechanism controlled in accordance with my invention. Fig. 2 is an enlarged sectional view taken on the line II—II of Fig. 1. Fig. 3

is a view similar to Fig. 2 but showing the parts in different operating positions.

Similar reference characters refer to similar parts in all three views.

Referring first to Fig. 1, the reference character A designates a railway switch comprising, as usual, two fixed rails 1 and 1a and two movable rails or switch points 2 and 2a. The fixed rails 1 and 1a are laid on tie plates 3, and are secured to crossties 4 in the customary manner. The movable rails 2 and 2a are fastened together by a front rod 5 and a head rod 6, and may be moved into a normal or a reverse position by means of a throw rod 7 which is connected with the head rod 6 through the medium of a switch basket 8. When the switch occupies its normal position, in which position it is shown in the drawings, the movable rail 2 engages the fixed rail 1, and the movable rail 2a is spaced from the fixed rail 1a. When the switch is reversed, however, the movable rail 2a then engages the fixed rail 1a, and the movable rail 2 is spaced from the fixed rail 1.

Secured to an elongated pair of the ties 4 adjacent to the outer side of the rail 1 is a switch operating apparatus B provided with point detector and latch mechanism controlled by a point detector rod D embodying my invention. The switch operating apparatus is identical with that shown and described in detail in Patent No. 2,184,870 referred to hereinbefore, and it is believed, therefore, that for purposes of my present invention it is sufficient to point out that this apparatus includes a switch actuating shaft 29 journaled in a suitable casing 10, and provided at its lower end with a switch operating arm 50a pivotally attached to the free end of the throw rod 7. The switch actuating shaft 29 is operatively connected through a suitable mechanism not shown with a hand throw lever 38, the parts being so proportioned that rotation of the hand throw lever 38 between its normal extreme position in which it is shown in Fig. 1 and its opposite extreme position will move the switch between its normal and reverse extreme positions.

The switch operating apparatus also includes a lock bar 51 which is mounted within the casing 10 for longitudinal sliding movement independently of the switch throwing mechanism, and which cooperates at one end with a lock rod L slidably mounted in the casing 10 at right angles to the lock bar. The lock rod L, as here shown, is of well known construction and comprises two longitudinally adjustable bars 120 and 121 attached at one end to the front rod 5 of the switch A and provided with two sets of registering notches 122 and 123 so disposed that the notches 122 will align with the lock bar when and only when the switch occupies its normal extreme position in which it is shown in Fig. 1 and the notches 123 will align with the lock bar when and only when the switch occupies its reverse extreme position.

The lock bar is movable between a locking position in which it enters whichever one of the set of notches 122 or 123 is then in alignment with the lock bar and an unlocking position in which it is withdrawn from the notches, and is arranged to be moved between its locking and unlocking positions by means separate from the switch operating apparatus. As here shown, the means for moving it comprises a ground lever 124 mounted in a lever stand 125 secured to one of the crossties 4, and operatively connected with the lock bar through an adjustable link 126.

It will be apparent, therefore, that when the switch occupies either extreme position, it will be locked in such extreme position or unlocked according as the ground lever 124 is rotated to the extreme position shown or its opposite extreme position.

It should be noted at this point that the lock rod L differs from that shown in the aforementioned Patent No. 2,184,870 in that the lock rod shown in the patent is provided with only one notch arranged to permit the switch to be locked in its normal extreme position only.

The apparatus B also comprises a suitable circuit controller which is identical with that shown and described in detail in the aforementioned Patent No. 2,184,870 except for the fact that the point detector lever 90 is provided with two laterally spaced rollers 94a and 94b in place of the single roller 94 shown in said patent, and that the point detector rod, which in the said patent is provided with a single notch 96 for cooperation with the single roller, has been replaced by the point detector rod D embodying my present invention to enable the point detector and latch mechanism to function in both the normal and the reverse positions of the switch in the same manner that it functions in the normal position only in said patent.

As best seen in Figs. 2 and 3, the point detector rod D is slidably mounted in axially aligned bushings 80 and 81 screwed into threaded openings formed in the opposite side walls of the casing 10, and comprises a main body portion 52 adjustably secured at one end to a link 97 fastened by means of a bolt 98 to the normally closed switch point 2 in the usual and well known manner. The other end of the point detector rod is provided with a portion 53 of reduced diameter which forms a shoulder 54, and which is screw threaded at its free end. A sleeve 55 having the same outside diameter as the main body portion 52 of the point detector rod, and an inside diameter which is just slightly larger than the reduced portion 53 of the point detector rod is of reduced inside diameter adjacent its outer end and threaded so as to be adjustably screwed onto the threaded end of the reduced portion and is arranged to be locked in an adjusted position by means of a jam nut 56. To facilitate adjusting the sleeve 55 the end adjacent to the jam nut is preferably provided with a wrench grip 55a having the same shape as the nut. Formed in the main body portion 52 is an annular notch 57 while formed in the sleeve 55 is a similar annular notch 60.

The main body portion of the point detector rod is so adjusted with relation to the link 97 that the notch 57 will align with the rollers 94a and 94b when and only when the switch occupies its full normal position and the switch point 2 is in close engagement with the fixed rail 1, while the sleeve 55 is so adjusted that the notch 60 will align with the rollers 94a and 94b when and only when the switch occupies its full reverse position and the switch point 2a is in close engagement with the fixed rail 1a. Sufficient space is provided between the sleeve 55 and the shoulder 54 to permit any adjustment of the sleeve necessary to take care of differences in the strokes of different switches to which the point detector rod might be attached, or differences in the stroke of a given switch over a period of time, and the two rollers 94a and 94b are spaced apart far enough so that with the maximum obtainable spacing between the sleeve and the shoulder it is impossible for the rollers to enter the space between

the sleeve and the shoulder during movement of the switch from either extreme position to the other, as shown in Fig. 3.

Since as pointed out above the details of construction of the circuit controller are identical to those shown and described in Patent No. 2,184,870, it is believed to be unnecessary to show and describe these details herein. It should be here pointed out, however, that the point detector lever **90** is biased by suitable means not shown to the position in which the rollers **94***a* and **94***b* will enter whichever one of the notches **57** or **60** in the point detector rod D is then in alignment with the rollers, and that the circuit controller includes a set of contacts which are controlled jointly by the lever **90** and by other means operated by the lock bar **51** in such manner that these contacts will be closed when and only when the switch is locked by the lock bar and the rollers **94***a* and **94***b* have fully entered one or the other of the notches **57** or **60**. This circuit controller also includes latch mechanism which, if the switch point which is in engagement with the associated fixed rail when the switch is locked in either extreme position is displaced, as by a train trailing the switch, a sufficient amount to force the rollers out of the aligned notches, will retain the contacts in their open positions until they are manually restored to their closed positions in a manner similar to that described in the said Patent No. 2,184,870.

One advantage of a point detector rod embodying my invention is that it enables a mechanism such as that shown and described in Patent No. 2,184,870 to be connected to a mechanism which will lock the switch in either extreme position, without sacrificing in the reverse extreme position the safety afforded by point detector and latch mechanism.

It should be particularly pointed out that while a detector rod embodying my invention is particularly useful in connection with apparatus of the type described in Patent No. 2,184,870, it is not limited to use in this type of mechanism but on the contrary can be used whenever a round detector rod having two relatively adjustable notches is required.

Although I have herein shown and described only one form of railway switch operating apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

A point detector rod comprising a round main body portion provided at one end with means for attaching it to a railway switch and at the other end with a portion of reduced diameter which forms a shoulder, said reduced portion being threaded at its free end, a sleeve having the same outside diameter as said main body portion mounted on said reduced portion and provided at one end with internal screw threads which cooperate with the threaded end of said reduced portion to enable said sleeve to be adjusted to different longitudinal positions on said reduced portion, and means for locking said sleeve in adjusted positions, said main body portion and said sleeve being provided with similar annular notches each adapted to at times receive a pair of laterally spaced rollers provided on the operating member of a point detector mechanism, sufficient space being provided between said sleeve and said shoulder to permit any adjustment of the sleeve necessary to enable the detector rod to be used in switches having different strokes or to take care of differences in the stroke of any given switch over a period of time but said space being less than the spacing between said rollers.

HERBERT L. BONE.