Sept. 8, 1953 W. M. POOLE 2,651,714

SELECTIVE POINT DETECTOR MECHANISM

Filed April 18, 1950 2 Sheets-Sheet 1

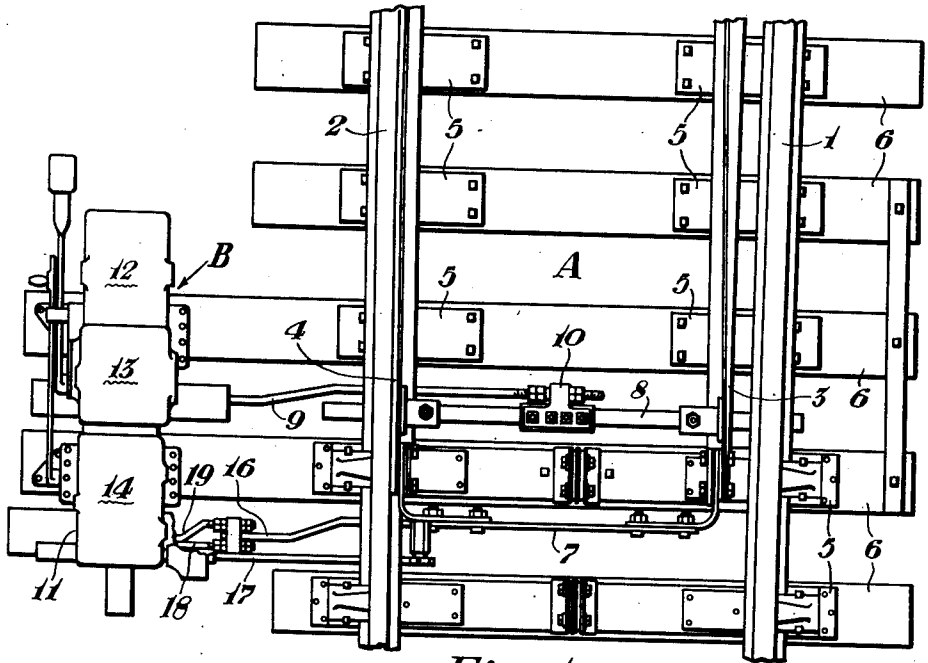


Fig. 1.

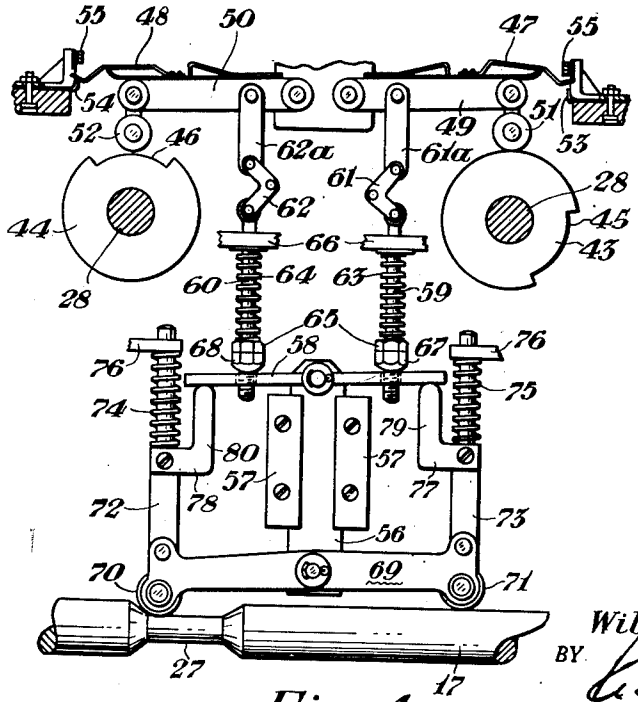


Fig. 4.

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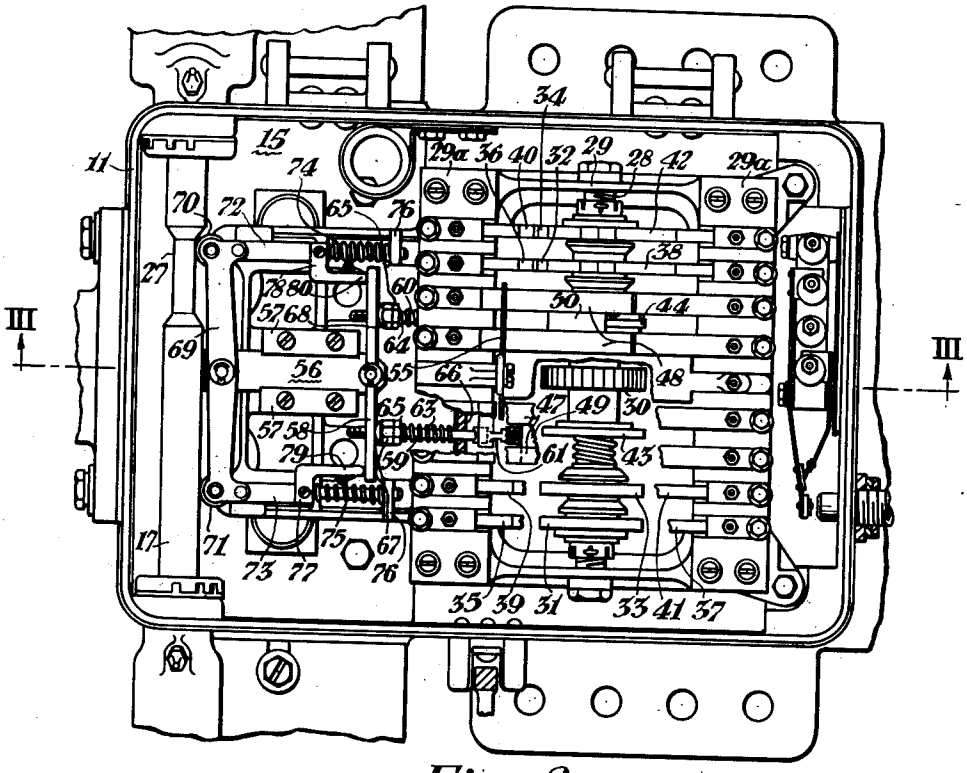


Fig. 2.

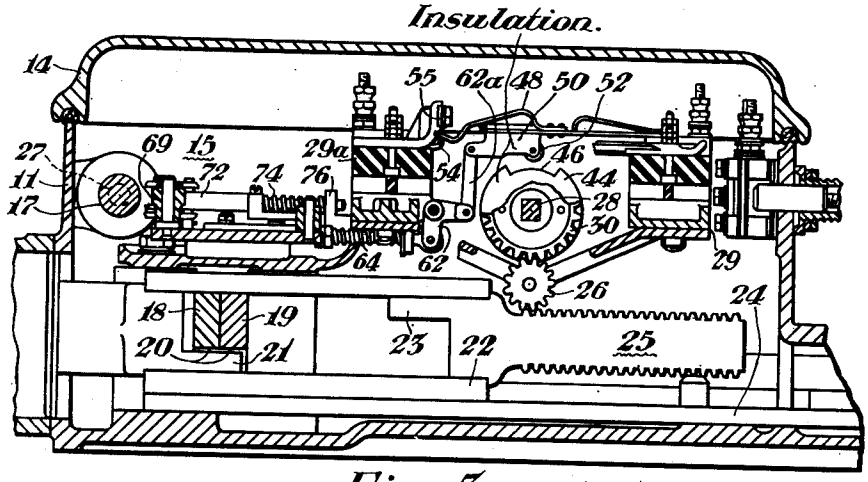


Fig. 3.

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SELECTIVE POINT DETECTOR MECHANISM

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3 Claims. (Cl. 246—253)

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My invention relates to a point detector mechanism for a circuit controller forming a part of a railway switch operating apparatus, and more particularly to a point detector mechanism for selectively controlling the indication contacts of the circuit controller.

Railway switch operating apparatus in which my novel point detector mechanism may be used to advantage normally comprises a motor controlled from a remote point to move the switch points of a railway switch from a normal position to a reverse position, and from the reverse position to the normal position. The apparatus also includes a circuit controller operated primarily by the operation of the switch motor with a point detector mechanism controlled by a point detector rod connected to the switch point, to control the indication contacts should the switch points fail to assume or remain locked in their normal or reverse positions for any reason.

In the point detector mechanism previously provided for switch operating apparatus of the type indicated above, the point detector rod cooperated with a rocker arm pivoted at its midpoint to a slidable short bar of the circuit controller. The rocker arm ends carried rollers which rode on the periphery of the point detector bar due to the bias of spring rods cooperating with the ends of the rocker arm, the rollers being adapted to be selectively received within a recess provided in the point detector rod when and only when the switch points were in their normal or reverse positions. The slidable short bar had pivoted to its other end an equalizer lever which cooperated through spring biased threaded rods and bell cranks with the movable contact fingers of the two pairs of indication contacts normally provided in the circuit controller. The movable contact fingers were also controlled by cams rotated by the operation of the switch motor. When and only when the switch points of the switch were in their normal or reverse position, would the point detector rod and the contact cams permit the pair of indication contacts corresponding to the position of the switch to close to set a clear signal for traffic moving over the switch.

In the event of a trailed switch, the prior point detector mechanisms would be operated by the movement of the point detector rod to open the closed pair of indication contacts to set a restrictive signal for traffic moving over the trailed switch. The prior point detector mechanism was such, however, that in the event of a trailed switch, the equalizer lever of the mechanism would be tilted to open either pair of the indication contacts remaining closed. Thus, the previous point detector mechanisms would open either pair of the indication contacts, but the operation of these indication contacts would not

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show which one of the two switch points was displaced.

The object of my invention is, therefore, to provide a point detector mechanism for a circuit controller of a railway switch operating apparatus which will selectively control the indication contacts of the circuit controller.

A further object of my invention is to provide a selective point detector mechanism which may readily be made of existing non-selective point detector mechanisms by the addition of a few readily installed parts.

According to my invention, I provide a pivoted lever which cooperates with offset lugs fixed to the spring rods cooperating with the ends of the rocker arm. The contact cams and the point detector rod are unchanged in their cooperation in permitting the indication contacts of the circuit controller to close when and only when the switch points are locked in their normal or reverse positions. Should the switch be trailed, the resultant movement of the point detector rod will force one or the other of the rollers of the rocker arm out of the point detector rod recess to tilt the rocker arm. The movement of the rocker arm will move the spring rod and the associated offset lug to tilt the corresponding end of the pivoted lever. As will hereinafter be more fully described, a switch trailed in its normal position will cause the pivoted lever to open the normal indication contacts, while a switch trailed in its reverse position will cause the pivoted lever to open the reverse indication contacts.

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

I shall describe one form of a point detector mechanism embodying my invention, and shall then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is a top plan view of a railway switch operated by a switch and lock movement incorporating a point detector mechanism embodying my invention. Fig. 2 is a top plan view of the circuit controller with the cover removed showing details of the point detector mechanism. Fig. 3 is a sectional view taken approximately along the line III—III of Fig. 2, while Fig. 4 is a schematic diagram of the point detector mechanism embodying the invention.

Similar reference characters refer to similar parts throughout the several views.

Referring to Fig. 1, the reference character A designates a railway switch comprising two fixed rails 1 and 2 and two movable switch points 3 and 4. The fixed rails 1 and 2 are laid on tie plates 5 secured to the crossties 6 in the usual manner. The switch points 3 and 4 are inter-

connected by a front rod 7 and a head rod 8, and may be moved from the normal position illustrated to a reverse position by means of a switch and lock movement B which is of the type shown and described in Letters Patent of the United States No. 1,293,290 granted to William Zabel on February 4, 1919 for Railway Traffic Controlling Apparatus. The switch and lock movement is connected with the head rod 8 by a throw rod 9 and the usual switch basket 10; the throw rod 9 extending under the fixed rail 2 and the switch point 4 and connected to the operating bar (not shown) of the movement.

When the switch A occupies its normal position as illustrated in Fig. 1, the switch point 4 engages the fixed rail 2 while the switch point 3 is spaced a predetermined distance away from the fixed rail 1. When the switch is reversed by the operation of the switch and lock movement B, the switch point 3 engages the fixed rail 1 and the switch point 4 is spaced from the fixed rail 2.

The switch and lock movement B comprises a casing 11 divided into three compartments, only one being illustrated. The compartments are provided with covers 12, 13 and 14; the cover 12 closing the motor compartment, the cover 13 closing the gear reduction compartment, and the cover 14 closing the circuit controller compartment 15 (Figs. 2 and 3). A lock rod 16 and a point detector rod 17 are fixed by suitable means to the front rod 7 and pass beneath the fixed rail 2 to the circuit controller compartment. The lock rod 16 is of the usual form comprising two locking bars 18 and 19 (Figs. 1 and 3). The locking bars are formed with notches in their upper and lower edges, only the lower edge notches 20 being illustrated in Fig. 3; the notches 20 being engaged by a locking dog 21 forming a part of a lock box 22 when the switch is in its normal position and properly locked. A second locking dog 23 is provided on the lock box for engaging the upper notches formed in the locking bars when the switch is in its reverse position.

The lock box 22 forms a part of a slide bar 24 reciprocated to its extreme right-hand position illustrated in Fig. 3 by the operation of the switch movement motor (not shown). The lock box is provided at its right-hand end with a rack 25, the teeth of which mesh with the teeth of a pinion 26 suitably mounted within the compartment 15. The rack 25 and the pinion 26 are shown in their extreme normal positions, the pinion 26 having been rotated in a counterclockwise direction by movement of the lock box and rack 25 in moving the switch points 3 and 4 to their normal position shown in Fig. 1. Reversing the switch points by operation of the switch and lock movement B through the throw rod 9 will at the same time cause the slide bar 24 to move from right to left. The rack 25 will accordingly be moved in the same direction to rotate the pinion 26 in a clockwise direction. The movement of the lock box 22 will withdraw the locking dog 21 from the lower notches 20 in the locking bars 18 and 19 permitting movement of the locking bars in response to the reversal of the switch points, the locking dog 23 entering the upper notches of the locking bars at the end of the movement of the switch points to lock the switch points in their reverse position.

The point detector rod 17 is of standard construction being circular in cross section and formed with an elongated peripheral notch 27 in that portion of the rod within the circuit controller compartment 15. The point detector rod

is adapted to coact with elements of the circuit controller which will now be described.

The circuit controller comprises a camshaft 28 journaled in a supporting framework 29 within the circuit controller compartment 15. The camshaft 28 has fixed thereto a gear 30 meshing with the pinion 26 which acts as an idler gear between the gear 30 and the rack 25. Movement of the lock box 22 by the slide bar 24 when the switch points are moved into their normal or reverse positions will accordingly rotate the gear 30 and the camshaft 28.

Mounted on and insulated from the camshaft 28 are four contact segments 31—34. The contact segments 31 and 33 are disposed on one side of the gear 30 while the contact segments 32 and 34 are disposed on the other side of the gear. Each contact segment 31—34 cooperates at its periphery with two inwardly extending contact fingers fixed to insulating strips 29a on the framework 29, the contact segments 31 and 33 cooperating with contact fingers 35, 37 and 39, 41, respectively, and the contact segments 32 and 34 cooperating with contact fingers 36, 38 and 40, 42, respectively. The contact segment 31 will at times cooperate with the contact fingers 35, 37 to close a contact 35—31—37, the contact segment 33 with the contact fingers 39, 41 to close a contact 39—33—41. Similarly, the contact segment 32 will at times close a contact 36—32—38 and the contact segment 34 will close a contact 40—34—42. The periphery of each cam segment may have any desired length, and the cam segments are secured to the camshaft 28 in any desired manner which will permit angular displacement to any desired position relative to the camshaft. The contact segments herein illustrated are of such lengths and are so positioned relative to the camshaft that the contacts 35—31—37 and 39—33—41 are closed at all times except when the slide bar 24 is in its extreme position illustrated in Fig. 3 in which the switch points 3, 4 are locked in their normal position as illustrated, while the contacts 36—32—38 and 40—34—42 are closed at all times except when the slide bar is in an extreme left-hand position in Fig. 3 in which the switch points 3 and 4 are locked in their reverse position. The four sets of contacts described may be used in a well-known manner to control the circuit for the switch and lock movement B, or for other desired purposes.

Mounted on the camshaft 28 on opposite sides of the gear 30 are two cams 43 and 44. The cam 43 is formed with a peripheral notch 45 while the cam 44 is provided with a similar notch 46 (Figs. 3 and 4). Associated with the cams 43 and 44 are two pairs of contact fingers 47 and 48, respectively, the fingers 47 being interconnected for simultaneous movement by an insulating bridge 49 and the fingers 48 being interconnected by an insulating bridge 50. The insulating bridges are provided with dependent rollers 51, 52, respectively, which coact with the corresponding cams and form an actuating means for the respective contact fingers when the cams are rotated.

Fixed to the insulating strips 29a on the framework 29 are two pairs of stationary contacts 53 and 54 (only one of each being shown in Fig. 4), adapted to be engaged by the contact fingers 47 and 48, respectively. The contact fingers 47 and 48 will at times assume inclined positions when the notches 45, 46 of the cams are opposite the rollers 51, 52, in which position the fingers 47 and 48 will engage the stationary contacts 53 and

54, respectively, as will hereinafter be more fully described. When the notches 45, 46 of the cams are not opposite the rollers 51, 52, the contact fingers will be lifted to engage an upper stationary or shunting contact 55. The cams 43, 44 are so arranged and the notches 45, 46 are of such length that all of the contact fingers 47, 48 will be lifted when the slide bar 24 is in motion. One pair of contact fingers however will normally be permitted to assume their lower positions when the slide bar is in one extreme end of its movement, while the other pair of fingers will normally be permitted to assume their lower positions when the slide bar is in the other extreme end of its movement, as will be more fully described hereinafter.

Means are now provided to control the contact fingers 47, 48 by the point detector rod 17 when the switch A is trailed in its normal or reverse position.

To this end, there is provided a short bar 56 slidably received within guides 57 and movable longitudinally toward and away from the left-hand end of the circuit controller (Fig. 2). A lever 58 is pivoted to the inner end of the bar 56 and is provided with through openings near its outer ends to receive the ends of two threaded rods 59 and 60 with some clearance. The other ends of the threaded rods are pivotally connected to the dependent arms of two bell cranks 61 and 62, respectively (Figs. 2 and 3), the bell cranks being pivotally mounted on the framework 29. The other arms of said bell cranks are pivotally connected to the insulating bridges 49 and 50, respectively, through links 61*a* and 62*a*.

Disposed on the threaded rods 59, 60 are coil springs 63 and 64, respectively, between the jam nuts 65 and the slotted guideways 66 through which the threaded rods pass. The two threaded rods are biased so that the nuts 67 and 68 on the ends of the respective rods abut the inner surface of the pivoted lever 58. It will be appreciated that by threading the nuts 67 and 68 on the respective rods 59 and 60, the effective lengths of the rods may be altered, the jam nuts 65 locking the nuts 67, 68 in place on the rod.

Pivoted to the outer end of the short bar 56 is a rocker arm 69 having rollers 70 and 71 fixed to the ends thereof and cooperating with the point detector rod 17 and its recess 27. The rollers 70, 71 are biased against the point detector rod by means of spring rods 72 and 73 and coil springs 74 and 75 disposed thereon, respectively. The spring rods are pivoted at their outer ends to the ends of the rocker arm 69 and slidably supported at their inner ends in lugs 76 of the framework 29. The coil springs 74 and 75 are disposed about their respective spring rods between the lugs 76 and offset lugs 77 and 78 fixed to the spring rods 73, 72, respectively. The offset lugs 77, 78 are L-shaped, the free ends 79 and 80, respectively, just engaging the ends of the pivoted lever 58 without pressure due to spring bias.

Referring now in particular to Fig. 4 of the drawings for an understanding of the operation of my novel point detector mechanism described, the point detector rod 17 is illustrated in its extreme normal position indicative of the normal position of the switch points 3 and 4 as illustrated in Fig. 1. The offset lugs 77, 78, the spring rods 72, 73, and the threaded rods 59 and 60 are so proportioned as to length, and the coil springs 63, 64 and 74, 75 so biased that when and only when the point detector rod 17 is in its extreme normal position, will the roller 70 be within the

point detector rod recess 27. The same proportioning of elements and the same spring bias will also insure the roller 71 being within the recess 27 when and only when the point detector rod is in its extreme reverse position indicative of a reverse position of the switch points 3 and 4 in which the switch point 3 engages the fixed rail 1.

As previously set forth, the cams 43 and 44 cooperate with the contact fingers 49 and 50 by way of the rollers 51 and 52 fixed to the insulating bridges 49 and 50. It will be noted in Fig. 4 that the cams 43 and 44 are fixed to the shaft 28 so that the respective cam notches 45 and 46 are 240° apart. In the description which follows, the cam 44 will be referred to as the normal contact cam, while cam 43 will be referred to as the reverse contact cam. The normal contact cam notch 46 will receive the roller 52 when the switch points 3 and 4 are in their normal position as illustrated in Fig. 1, while the roller 51 will ride on the periphery of the reverse contact cam 43. When the switch A is reversed, the movement of the slide bar 24 through the rack 25, pinion 26 and gear 30 will rotate the shaft 240° so that the roller 51 will then be received within the reverse contact cam notch 45 and roller 52 will ride on the periphery of the normal contact cam 44.

When the switch A is in its normal position and properly locked, the point detector rod notch 27 will receive the roller 70 of the rocker arm 69 which will permit the insulating bridge 50 to assume an inclined position with the roller 52 within the normal contact cam notch 44. Contact fingers 48 will then engage the fixed contacts 54. On the other hand, the roller 71 of the rocker arm will engage the point detector rod 17 tending to lift the right side of the pivoted bar and the threaded rod 59. The roller 51 of the insulating bridge 49 riding the periphery of the reverse contact cam will lift the contact fingers 47 to engage the shunting contact 55. The contact fingers 47, 48 and the fixed contacts 53, 54 and 55 control the indicating circuits; the closed contacts 47, 53 and 48, 54 providing a clear signal over the switch A, the open contacts 47, 53 and 48, 54 providing a stop signal, and the engagement of the shunting contacts 47, 55 and 48, 55 short-circuiting the signal control relay and thus preventing stray currents or crosses on the external wires from energizing the relay improperly and causing improper signal operation.

When the switch points 3 and 4 are reversed, the slide bar 24 will, through the rack 25 and pinion 26, rotate the gear 30 and the shaft 28 to reverse the positions of the normal and reverse contact cams 44 and 43. During movement of the switch points 3 and 4, the point detector rod will be moved from the extreme position illustrated to an extreme reverse position. With the slide bar at the end of its reverse stroke, the switch will be properly locked and the point detector rod 17 will have been moved into its extreme position wherein the roller 71 enters the recess 27. The insulating bridge 49 will thus be inclined so that roller 51 is within the reverse cam notch 45 and the shunting contacts 47, 55 will open and the contacts 47, 53 will close. The normal contact cam 44 having been rotated 240° will lift the contact finger 48 into engagement with the shunting contact 55.

The point detector mechanism described has been termed a selective mechanism in that the proper indicating contacts are closed for a particular position of the switch points 3 and 4. Thus, if the switch is trailed when the switch

points are in their normal position as illustrated in Fig. 1, the indication contacts 48, 54 will be opened. Should the switch A be trailed when the switch points are in their reverse position, the indication contacts 47, 53 will be opened. If we asssume that the switch is in its normal position as illustrated in Fig. 1 and the switch is trailed, the point detector rod will be moved by the trailed switch points to force the roller 70 out of the point detector rod recess 27. The roller 71 acting as a fulcrum will allow the rocker arm 69 to pivot about this point in a clockwise direction to move the spring rod 72 and offset lug 78 upwardly. The short bar 56 will also be moved upwardly but only about half the distance that the spring rod 72 is moved since the short bar 56 is about midway between the rollers 70 and 71. The bias of the springs 74 and 64 being such that the offset lug portion 80 just touches the pivoted lever 58, the upward movement of the spring rod 72 will bypass any effect the pivoted lever may have on the threaded rod 60 and act directly on the threaded rod 60 to pivot the bell crank 62 in a counterclockwise direction (Fig. 3) to move the link 62*a* upwardly. The insulating bridge 50 will thus be moved upwardly to open the indication contacts 48, 54 to provide a stop signal over the switch A.

If the switch A is trailed when the switch points 3 and 4 are in their reverse position, the roller 71 will be forced out of the point detector rod recess 27 to move the spring rod 73 and threaded rod 59 upwardly to open the contacts 47, 53 and to close the contacts 47, 55; the contacts 48, 55 being closed by the action of the normal cam 44 and the roller 52 on the periphery thereof.

It will be appreciated from the foregoing description that the cooperation of the roller 70 and the point detector rod recess 27 will permit the contacts 48, 54 to close when the switch A is in its normal position, and to open the contacts 48, 54 and close the shunting contacts 48, 55 whenever the switch is trailed in its normal position. Thus, the closed contacts 48, 54 will indicate that the switch point 4 is against the fixed rail 2. Similarly, the cooperation of the roller 71 and the point detector rod recess 27 will permit the contacts 47, 53 to close when the switch A is locked in its reverse position and to open the contacts 47, 53 and close the shunting contacts 47, 55 when the switch A is trailed in its reverse position. The closed contacts 47, 53 will indicate that the switch point 3 is against the fixed rail 1. The point detector mechanism described is thus selective in that the roller (70) on the left side of the machine (Fig. 4) will always operate the indication contacts on the left side of the machine, and the roller (71) on the right side of the machine will always operate the indication contacts on the right side of the machine.

In point detector mechanisms of previous design it was possible to operate the switch and open and close the indication contacts with the point detector rod disconnected or broken off and with the point detector rod remaining in either of its extreme positions with a roller of the rocker arm within the point detector rod recess. In the point detector mechanism herein described, I have overcome this shortcoming of previous mechanisms by increasing the length of the pivoted lever 58 to the length shown in the drawings and adding the offset lugs 77 and 78 to the respective spring rods.

If we consider the point detector mechanism herein described without the offset lugs 77 and 78, it will be appreciated that the pivoted lever 58, the short bar 56 and the rocker arm 69 form a walking beam arrangement. If we assume the detector rod 17 as being disconnected from the front rod 7 and remaining in its normal position as illustrated in Fig. 4, a reversal of the switch will rotate the contact cams 43 and 44 to their reverse positions in which roller 51 may enter the cam notch 45 and roller 52 will ride on the periphery of cam 44 to close the shunting contacts 48, 55. Since the roller 70 remains in the point detector rod recess 27, the rocker arm 69 will be tilted to hold the short bar 56 in the position illustrated. The normal contact cam 44 holding the insulating bridge 50 in its tilted position will lift the threaded rod 60 and the nut 68 against the bias of the spring 64. The roller 51 being opposite, the reverse contact cam notch 45 will enter the notch due to the downward pull of the spring 63. The nut 67 will thus engage the lever 58 tending to rotate the lever 58 in a clockwise direction. The indication contacts 47, 53 will thus be closed despite the disconnected point detector rod.

Under the same conditions with the point detector mechanism including the extended lever 58 and offset lugs 77 and 78 as described, a reversal of the switch will rotate the contact cams 43 and 44 to their reverse positions. The normal contact cam 44 will close the shunting contacts 48, 53, but the reverse contact cam 43 will not affect the condition of the closed shunting contacts 47, 55. The roller 71 riding on the surface of the point detector rod 17 will lift the spring rod 73; the offset lug end 79 lifting the end of the lever 58 and the threaded rod 59. The bridge 49 and contact finger 47 will be held in their inclined positions as illustrated, with the shunting contacts 47, 55 closed. Thus both shunting contacts 48, 55 and 47, 55 will be closed.

A return of the switch points to their normal position will permit the shunting contacts 48, 55 to open and the indication contacts 48, 54 to close. Under similar circumstances should the point detector rod become disconnected when switch A is in its reverse position, the roller 71 will remain in the recess 27 permitting the contacts 47, 53 to close, while roller 70, riding on the periphery of the point detector rod, will hold the shunting contacts 48, 55 closed at all times. Thus in operating the switch and lock movement B from a remote point, the continued failure of the signals to clear when the switch is thrown to a certain position will indicate that the switch and lock movement is not working properly and a maintainer will then be sent out to check the operation of the movement.

I have thus provided a point detector mechanism for a switch and lock movement which will selectively open the indication contacts of the circuit controller in response to the positions of the individual switch points of the switch. In accordance with my invention, the nonselective point detector mechanisms now in operation may be readily adapted to operate as selective point detector mechanisms by the additions thereto of a lengthened pivoted lever (58) and the offset lugs (77, 78) in the manner described.

Although I have herein shown and described only one form of a selective point detector mechanism 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:

1. A point detector for switch operating apparatus of the type having a slide bar for locking the switch points in their two extreme positions, a shaft operatively connected with said slide bar for rotation thereby, two cams on said shaft, a first contact actuating member cooperating with the first of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their first position and to a second contact actuating position when said switch points are not in their first position and a second contact actuating member cooperating with the second of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their second position and to a second contact actuating position when said switch points are not in their second position, comprising a point detector rod movable by said switch points to a first position when said switch points are in their first position and to a second position when said switch points are in their second position, a recess in said point detector rod, a rocker arm pivoted intermediate its ends and carrying a first and second roller adapted to ride on the periphery of said point detector rod, said first roller entering the point detector rod recess when and only when said point detector rod is in its first position, said second roller entering the point detector rod recess when and only when said point detector rod is in its second position; means connected to said rocker arm on one side of its pivot point and cooperating with said first contact actuating member to move and hold only said first contact actuating member in its second contact actuating position whenever said first roller is out of said point detector rod recess, and a second means connected to said rocker arm on the other side of its pivot point and cooperating with said second contact actuating member to move and hold only said second contact actuating member in its second contact actuating position whenever said second roller is out of said point detector rod recess.

2. A point detector for switch operating apparatus of the type having a slide bar for locking the switch points in their two extreme positions, a shaft operatively connected with said slide bar for rotation thereby, two cams on said shaft, a first contact actuating member cooperating with the first of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their first position and to a second contact actuating position when said switch points are not in their first position and a second contact actuating member cooperating with the second of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their second position and to a second contact actuating position when said switch points are not in their second position, comprising a point detector rod movable by said switch points to a first position when said switch points are in their first position and to a second position when said switch points are in their second position, a recess in said point detector rod, a rocker arm pivoted intermediate its ends, a first roller and a second roller carried by the ends of said rocker arm adapted to ride on the periphery of said point detector rod, said first roller entering the point detector rod recess when and only when said point detector rod is in its first position, said second roller entering said point detector rod recess when and only when said point detector rod is in its second position, an abutment member carried by each end of said rocker arm, means cooperating with the abutment member on one side of said rocker arm to move and hold only said first contact actuating member in its second contact actuating position whenever said first roller is out of the point detector rod recess, and a second means cooperating with the abutment member on the other side of said rocker arm to move and hold only said second contact actuating member in its second contact actuating position whenever said second roller is out of said point detector rod recess.

3. A point detector for switch operating apparatus of the type having a slide bar for locking the switch points in their two extreme positions, a shaft operatively connected with said slide bar for rotation thereby, two cams on said shaft, a first contact actuating member cooperating with the first of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their first position and to a second contact actuating position when said switch points are not in their first position and a second contact actuating member cooperating with the second of said cams adapted to be moved to a first contact actuating position when said switch points are locked in their second position and to a second contact actuating position when said switch points are not in their second position, comprising a point detector rod movable by said switch points to a first position when said switch points are in their first position and to a second position when said switch points are in their second position, a recess in said point detector rod, a rocker arm pivoted intermediate its ends, a first roller and a second roller carried by the ends of said rocker arm adapted to ride on the periphery of said point detector rod, said first roller entering the point detector rod recess when and only when said point detector rod is in its first position, said second roller entering said point detector rod recess when and only when said point detector rod is in its second position, an abutment member carried by each end of said rocker arm, a pivoted lever, the ends of said lever being engaged by said abutment members; and link members connected to said first and second contact actuating members and cooperating with said pivoted lever, so that when said point detector rod is out of its first position said first roller will pivot said rocker arm to pivot said lever by an abutment member in one direction to move only the link member connected to said first contact actuating member thereby moving said first contact actuating member to its second contact actuating position, and when said point detector rod is out of its second position said second roller will pivot said rocker arm to pivot said lever by the other abutment member in an opposite direction to move only the link member connected to said second contact actuating member thereby moving said contact actuating member to its second contact actuating position.

WILLIAM M. POOLE.

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