Dec. 28, 1954 J. E. SPEER 2,698,378

POINT DETECTOR ROD

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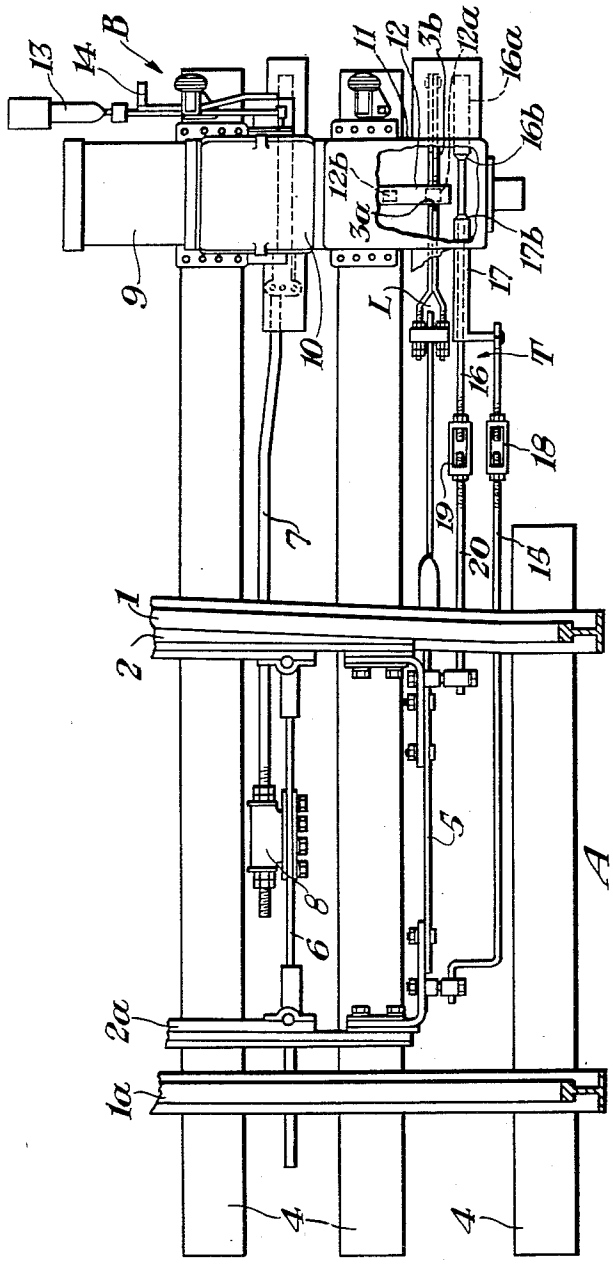


Fig. 1.

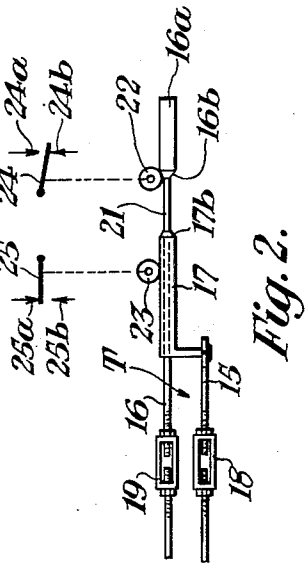


Fig. 2.

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POINT DETECTOR ROD

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11 Claims. (Cl. 246—253)

My invention relates to railway switch operating apparatus, and particularly to a point detector rod for actuating a circuit controller forming a part of a switch and lock movement.

The usual switch and lock movements for a railway switch comprise power and/or manual means for moving the switch points of the switch between their two extreme positions and for locking them in the extreme position to which they are moved. A switch and lock movement also usually includes a circuit controller which controls, through suitable circuits, the wayside signals which govern traffic movements over the switch. The contacts of the circuit controller are usually actuated by the joint operation of a point detector rod connected to the switch points and the lock bar of the switch and lock movement.

The contacts of the circuit controller are usually so arranged that upon operation of the switch and lock movement to move the switch points to, and lock them in their extreme normal position, one set of indication contacts will be closed and another set of indication contacts will be open, whereas upon operation of the switch and lock movement to move the switch points to, and lock them in their extreme reverse position, said one set of indication contacts will be open while said other set of indication contacts will be closed. In the event a switch is trailed when the switch points are in either of their extreme positions, the point detector rod connected to the switch points will be moved to open the closed set of indication contacts so that a restrictive signal is set against traffic movements over the switch.

The usual point detector rod is directly connected to only one switch point, usually the switch point nearest the circuit controller. With this arrangement, so long as the switch point which is directly connected to the point detector rod is in one of its extreme positions, the point detector rod is undamaged and the switch is locked by the switch and lock movement, the signals can be cleared to permit traffic movement over the switch. Yet at that instant, the switch point which is not directly connected to the point detector rod may not be in its proper position due to the fact that it is damaged or out of adjustment. Such a condition cannot be detected by a point detector rod connected to only one switch point.

One object of my present invention is to provide a point detector rod which can be used in existing types of switch and lock movements to actuate the contacts of a circuit controller in place of the usual point detector rod, and which will enable the position of each switch point to be individually detected.

According to my invention, the point detector rod comprises a bar adjustably connected at one end to one of the switch points and provided at the other end with an enlarged portion forming a shoulder which acts as a cam face. Slidably mounted on this bar is a sleeve. This sleeve is adjustably connected to the other switch point, and is provided at the end nearest the enlarged portion of the bar with a shoulder which acts as a second cam face, the two cam faces together forming an elongated notch. The notch formed by the two shoulders cooperates with suitable cam followers which actuate the indication contacts of a circuit controller. The parts are so proportioned and so adjusted that when the switch is locked in its normal position, the one cam follower will just enter the notch at the end formed by the shoulder of the bar while the other cam follower

is riding on the sleeve, whereas when the switch is locked in its reverse position, the other cam follower will just enter the notch at the end formed by the shoulder of the sleeve, the first cam follower riding on the enlarged portion of the bar. The two cam followers may be connected to indication contacts by appropriate linkage.

Other objects of my invention will appear hereinafter as the characteristic features of construction and mode of operation of my point detector rod are described in detail.

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

In the accompanying drawings, Fig. 1 is a plan view of a railway switch operated by a switch and lock movement provided with a point detector rod embodying my invention. Fig. 2 is a schematic drawing of the essential portions of my point detector rod.

Similar reference characters refer to similar parts in both views.

Referring now to Fig. 1 of the drawings; the reference character A designates a railway switch comprising two fixed rails **1** and **1***a* and two movable rails or switch points **2** and **2***a*. The fixed rails are secured in the usual manner to cross ties **4**. The movable rails **2** and **2***a* are fastened together by means of a front rod **5** and a head rod **6**, and may be moved to their normal or reverse positions by means of a throw rod **7** which is connected to the usual switch basket **8** fixed to the head rod **6**. When the switch A occupies its normal position, as illustrated in Fig. 1, the movable rail **2** engages the fixed rail **1** while the movable rail **2***a* is spaced from the fixed rail **1***a*. When the switch A is in its reverse position, the movable rail **2***a* engages the fixed rail **1***a* while the movable rail **2** is spaced from the fixed rail **1**.

Secured to two elongated cross ties **4** adjacent to the outer side of fixed rail **1** is a switch and lock movement B. This switch and lock movement may be of any suitable type, but as illustrated here it is similar to the switch and lock movement illustrated and described in Letters Patent of the United States No. 2,388,819, granted to Herbert L. Bone on November 13, 1945, for Railway Switch Operating Apparatus. The switch and lock movement B forms no part of my present invention, and for purposes of the present disclosure it is sufficient to point out that this movement includes three enclosures **9**, **10** and **11**, housing a drive motor (not shown), a reduction gearing and selector mechanism (not shown), and a circuit controller (not shown), respectively. Rotatably mounted in one side of the enclosure **10** are a hand-throw lever **13** and a selector lever **14**, the functions of which will be pointed out hereafter.

The usual lock rod L is slidably received within enclosure **11**. Lock rod L is operatively connected at one end to front rod **5** and extends through the circuit controller enclosure **11** in order to cooperate with the lock bar **12** of the switch and lock movement. If the switch is locked in its normal position, a first locking dog **12***a* on lock bar **12** is disposed within a first set of notches **3***a* in lock rod L. If the switch is thrown to its reverse position, the lock bar is moved so as to withdraw the first locking dog **12***a* from the first set of notches **3***a* (a downward direction as shown in Fig. 1) in order to unlock the switch, the switch points are then thrown to their extreme reverse position, the lock bar **12** again moves in the same direction as it moved in the beginning of the movement so that if the switch points are properly in their reverse position a second locking dog **12***b* will be disposed within a second set of notches **3***b* in order to lock the switch in its extreme reverse position. If a more complete description of the locking mechanism is desired, reference may be had to the above-mentioned Bone patent.

Under normal operating conditions, the switch A will be moved to its normal and reverse positions by operation of the drive motor of the switch and lock movement B. The selector lever **14** and hand-throw lever **13** provide an over-riding manual control of the switch and lock movement. When the selector lever **14** is moved from its motor position as illustrated in Fig. 1, to its manual position, it operates a clutch mechanism within the enclosure

10 to disengage the drive motor from the switch and lock movement and engage the hand-throw lever 15 with the movement. Operation of the drive motor with the selector lever in its motor position, or movement of the hand-throw lever 15 from one extreme position to the other when the selector lever is in its manual position will operate, through suitable means, throw rod 7 to move the switch points 2 and 2a to their normal or reverse positions, as the case may be.

The circuit controller of the switch and lock movement B is controlled in part by a point detector rod T embodying my present invention. As here shown, this point detector rod comprises a bar 16 which is adjustably connected at one end to the switch point 2 by suitable means, here shown as a turn buckle 19 and a connecting rod 20. The bar 16 extends with clearance through a suitable bearing provided in one side wall of the circuit controller enclosure 11, and is provided at its free end with an enlarged portion 16a which is slidably mounted in a suitable bearing provided in the other side wall of the enclosure 11. The point detector rod T also includes a sleeve 17 which is slidably mounted on the bar 16 within the bearing in the side wall of the circuit controller enclosure 11 through which the rod 16 enters the enclosure, and is adjustably connected with the other switch point 2a by suitable means here shown as turn buckle 18 and connecting rod 15.

As shown in the drawings, both the bar 16 and the sleeve 17 are circular in cross section, although other suitable cross sectional shapes may be used. The junction of the small and large portions of the bar 16 is beveled and forms a cam face 16b which confronts a similarly beveled cam face 17b formed on the inner end of the sleeve 17, and which forms with the beveled face 16b a peripheral notch 21 of adjustable length for a purpose which will be made clear presently. The beveled cam faces 16b and 17b cooperate respectively with cam followers, here shown as rollers 22 and 23, forming part of a suitable circuit controller which may be similar to that described in the aforementioned Bone patent.

The roller 22 is biased, by suitable means not shown, in a direction to enter the notch 21 adjacent to the cam face 16b, and is operatively connected with a contact finger 24 which cooperates with two fixed contact fingers 24a and 24b to close a contact 24—24b and open the contact 24—24a when the roller is in the notch 21 and to open the contact 24—24b and close the contact 24—24a when the roller 22 is forced out of the notch 21. The roller 23 is similarly biased to enter the notch 21 adjacent the cam face 17b, and is operatively connected to a contact finger 25 which cooperates with two fixed contact fingers 25a and 25b to close the contact 25—25b and open the contact 25—25a when the roller 23 is in the notch 21 and to close contact 25—25a and open contact 25—25b when the roller 23 is forced out of the notch 21.

In actual practice, the parts are so adjusted that the roller 22 will just enter the notch 21 when and only when the switch point 2 is in proper engagement with the fixed rail 1, while the roller 23 will just enter the notch 21 when and only when the switch point 2a is in proper engagement with the fixed rail 1a. It will be seen, therefore, that with a point detector rod constructed in accordance with my invention, any displacement of the closed switch point due to trailing, bending, warping or any other cause regardless of which switch point it may be, will cause the corresponding "a" contact to open and the "b" contact to close, thereby providing a means for establishing a restrictive wayside signal. It also can be seen that if either connecting rod is broken, and the switch is thrown to its opposite position, either both "a" contacts or both "b" contacts will be closed and a restrictive wayside signal will likewise result.

Although I have herein shown and described only one form of a point detector rod embodying my invention, it will be 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. In combination with the circuit controller of a switch and lock movement for operating a railway switch comprising the usual switch points, a point detector rod comprising a bar adjustably connected at one end to one switch point of the railway switch to move in unison therewith and provided at its free end with an enlarged portion forming a first cam face, a sleeve slidably mounted on said bar and adjustably connected to the other switch point of said railway switch to move in unison therewith, said sleeve being provided at one end with a second cam face which confronts said first cam face and which forms with said first cam face a cam notch of adjustable length, and contact operating cam followers cooperating with said notch to provide individual point detection.

2. In combination with the circuit controller of a switch and lock movement for operating a railway switch, a point detector rod comprising a bar of circular cross section adjustably connected at one end to one switch point of a railway switch to move in unison therewith and provided at its free end with an enlarged portion of circular cross section forming a first cam face, a sleeve of annular cross section slidably mounted on said bar and adjustably connected to the other switch point of said railway switch to move in unison therewith, said sleeve being provided at one end with a second cam face which confronts said first cam face and which forms with said first cam face a cam notch of adjustable length, and contact operating cam followers cooperating with said notch at its opposite ends to provide individual point detection.

3. In combination with a railway switch operated by a switch and lock movement equipped with a circuit controller enclosed in a housing, said railway switch comprising two fixed rails and two switch points, a point detector rod comprising a bar provided at one end with an enlarged portion forming a first cam face, said enlarged portion slidably mounted in said housing, said housing provided with an aperture through which said bar is slidably received into said housing, a first rod connected at one end to one of said switch points and at its free end adjustably connected to the free end of said bar to cause said bar to move in unison with said switch point, and a sleeve slidably mounted on said bar and slidably received within said housing through said aperture, a second rod connected to the other of said switch points at one end and at its free end adjustably connected to said sleeve to cause said sleeve to move in unison with said other switch point, said sleeve being provided at its free end with a second cam face which confronts said first cam face and which forms with said first cam face a cam notch of adjustable length, and contact operating cam followers cooperating with said notch at its opposite ends to provide individual point detection.

4. In combination with a railway switch operated by a switch and lock movement including a circuit controller enclosed in a housing, said railway switch comprising two fixed rails and two switch points, a point detector rod comprising a bar of circular cross-section and provided at one end with an enlarged portion forming a first cam face, said enlarged portion slidably mounted in said housing, said housing provided with a circular aperture through which said bar is slidably received into said housing, a first rod of adjustable length connected at one end to one of said switch points and at the other end connected to the free end of said bar to move said bar in unison with said switch point, and a sleeve of annular cross-section slidably mounted on said bar and slidably received within said housing through said aperture, a second rod of adjustable length connected to the other of said switch points at one end and at the other end connected to said sleeve to move said sleeve in unison with said other switch point, said sleeve being provided at its free end with a second cam face which confronts said first cam face and which forms with said first cam face a cam notch of adjustable length, and contact operating cam followers cooperating with said notch at its opposite ends to provide individual point detection.

5. A point detector rod comprising a bar adapted to be connected to a point of a railway switch to move in unison therewith and provided with a first cam actuating surface, and a sleeve slidably mounted on said bar and provided with a second cam actuating surface which cooperates with said first cam actuating surface to form a notch, said sleeve being adapted to be connected to the other point of said switch to move in unison therewith, said bar and sleeve normally having no relative motion between them.

6. A point detector rod comprising a bar adapted to be adjustably connected to one point of a railway switch to move in unison therewith and provided with a first cam actuating surface, and a sleeve slidably mounted on said bar and provided with a second cam actuating surface

which cooperates with said first cam actuating surface to form a notch, said sleeve being adapted to be adjustably connected to the other point of said railway switch to move in unison therewith, said bar and sleeve normally remaining in predetermined relative positions but being independently movable to detect any change in the normal relative position of the switch points.

7. A point detector rod for individually detecting the positions of switch points of a railway switch and which may replace some standard point detector rods which detect the positions of only one switch point comprising a bar of circular cross section having an enlarged portion at one end and being adapted to be adjustably connected at the other end to one of said switch points to move in unison therewith, the shoulder between the main portion of said bar and said enlarged portion forming a first cam face, and a sleeve of annular cross section slidably mounted on said main portion of said bar and having an outside diameter substantially the same as the diameter of said enlarged portion of said bar, the end of said sleeve confronting said first cam face forming a second cam face and the other end of said sleeve being adapted to be adjustably connected to the other of said switch points to move in unison therewith, said bar and said sleeve normally remaining in predetermined relative positions but being independently movable to detect any change in the normal relative position of the switch points.

8. A point detector rod for cooperating with a circuit controller, said point detector rod comprising a bar provided with a first cam actuating surface for actuating a contact of said circuit controller, said bar being adapted to be adjustably connected to a point of a railway switch to move in unison therewith, and a sleeve slidably mounted on said bar and provided with a second cam actuating surface for actuating another contact of said circuit controller, said sleeve being adapted to be adjustably connected to the other point of said railway switch to move in unison therewith, said bar and sleeve normally remaining in fixed relative positions but movable to other relative positions in response to displacement of one switch point from its normal position with respect to the other switch point.

9. A point detector rod comprising a bar of circular cross section provided with an enlarged portion at one end forming a first cam face and adapted to be adjustably connected at the other end to a switch point of a railway switch to move in unison therewith, and a sleeve of annular cross section slidably mounted on said bar and adapted

to be adjustably connected to another point of said switch to move in unison therewith, said sleeve being provided at its end remote from said other switch point with a second cam face which confronts said first cam face to form a cam notch of adjustable length, the length of said cam notch once adjusted normally remaining constant, and means cooperating with said cam surfaces to provide individual point detection.

10. In combination with the circuit controller of a switch and lock movement adapted to cooperate with the switch points of a railway switch and enclosed in a housing provided with an aperture, a point detector rod comprising a bar slidably mounted in said housing and having a first cam face near the end within said housing and having its other end adapted to be connected to one of the switch points to move in unison therewith, said bar being received into said housing through said aperture, and a sleeve slidably mounted on said bar and slidably received into said housing through said aperture, said sleeve having a second cam face at one end and adapted to be connected at its other end to the other switch point to move in unison therewith and means actuated by said cam faces for providing individual point detection.

11. In combination with a switch and lock movement adapted to operate a railway switch comprising two switch points, said switch and lock movement including a circuit controller enclosed in a housing provided with an aperture, a point detector rod comprising a bar slidably mounted in said housing and having an enlarged portion forming a first cam face, said bar being received within said housing through said aperture and adapted to be connected at its end remote from said enlarged portion to one of said switch points to move in unison therewith, and a sleeve slidably mounted on said bar and slidably received into said housing through said aperture, said sleeve being provided at its end within said housing with a second cam face which confronts said first cam face and having its other end adapted to be connected to the other of said switch points to move in unison therewith, and contact actuating cam followers cooperating with said cam faces to provide individual point detection.

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