A. C. LIVERMORE.

APPARATUS FOR CONTROLLING THE PASSAGE OF VEHICLES ALONG A RAILWAY.

APPLICATION FILED NOV. 11, 1910.

1,039,418.

Patented Sept. 24, 1912.

3 SHEETS—SHEET 1.

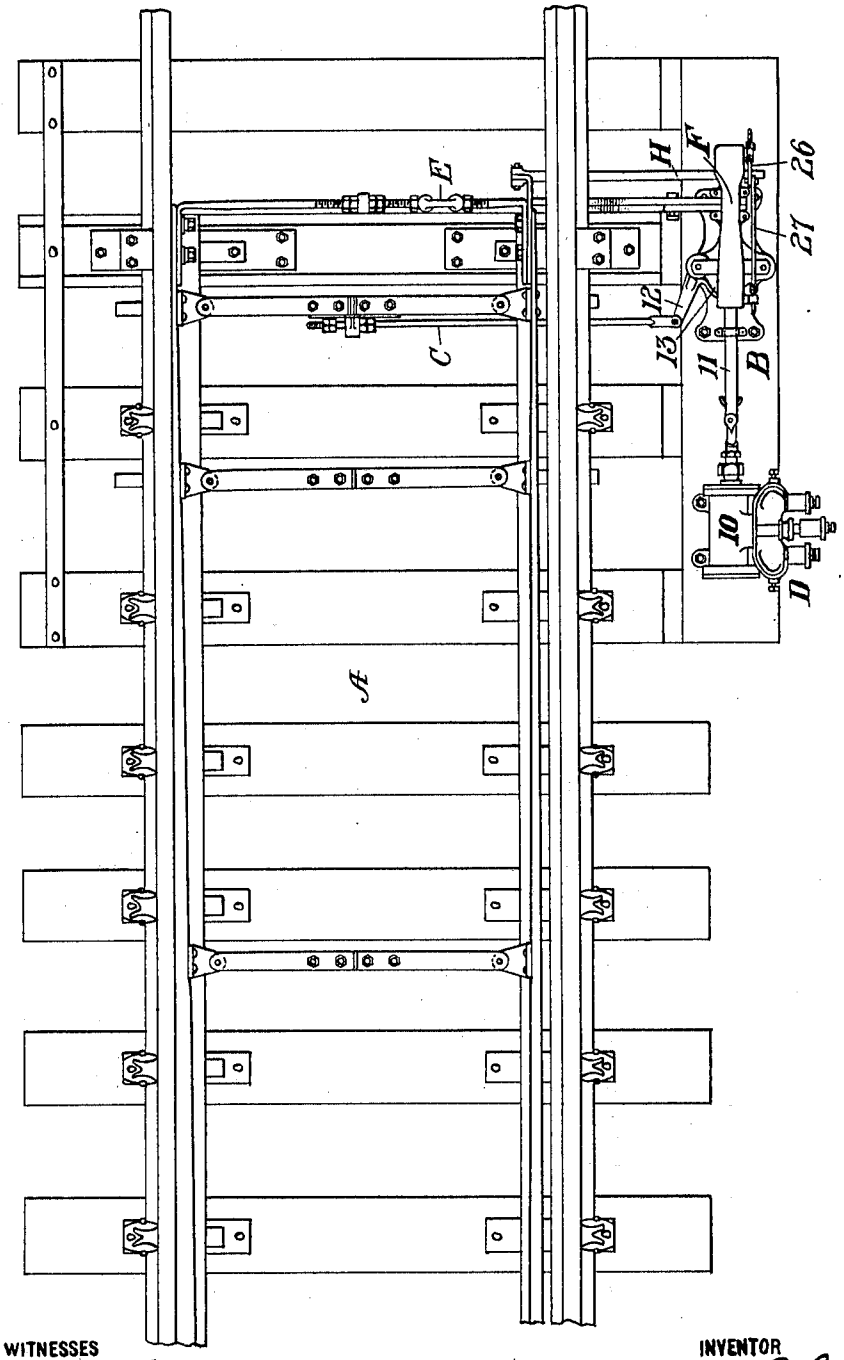

FIG. 1

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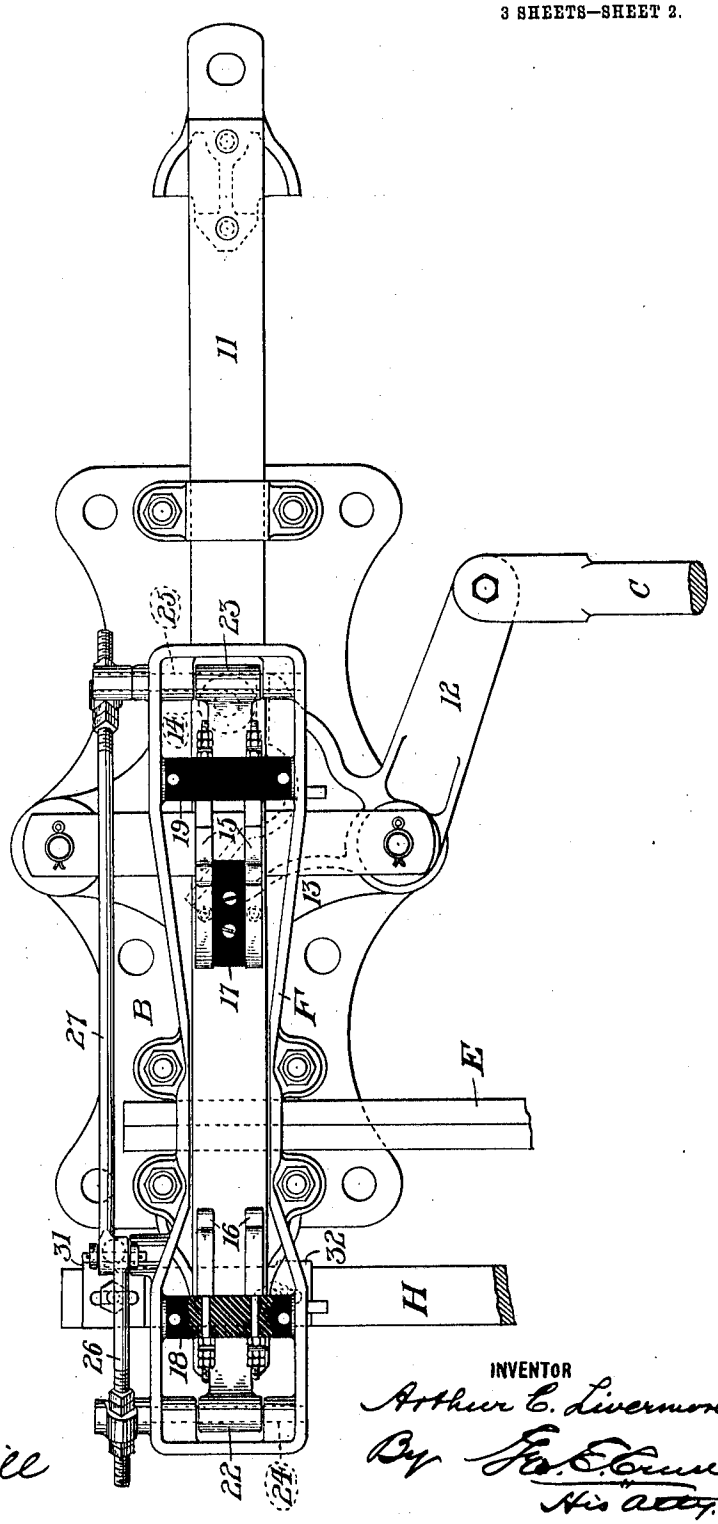
3 SHEETS—SHEET 2.

FIG. 2



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3 SHEETS—SHEET 3.

FIG. 3

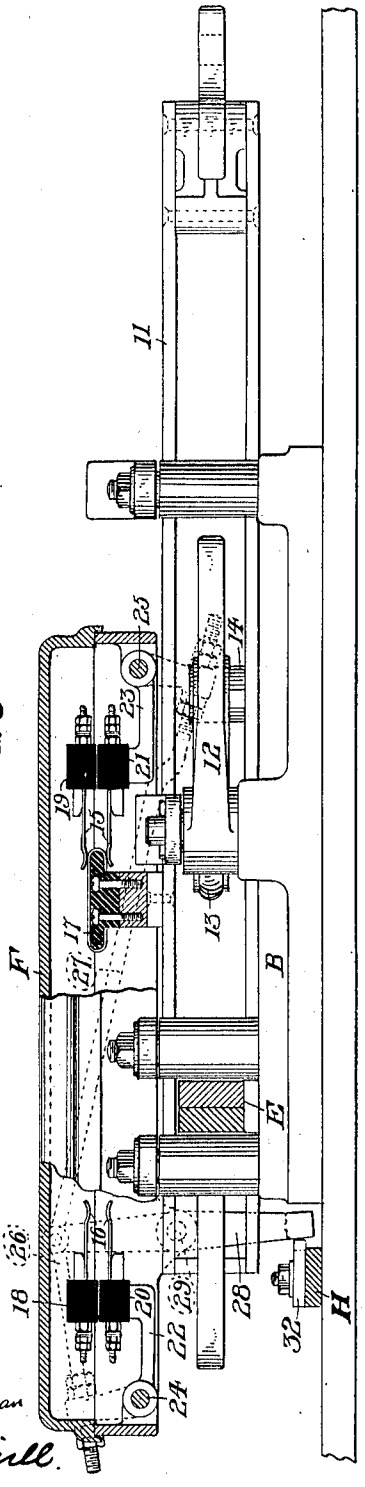
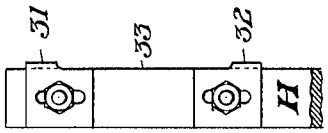


FIG. 4



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ARTHUR C. LIVERMORE, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR CONTROLLING THE PASSAGE OF VEHICLES ALONG A RAILWAY.

1,039,418. Specification of Letters Patent. **Patented Sept. 24, 1912.**

Application filed November 11, 1910. Serial No. 591,855.

To all whom it may concern:

Be it known that I, ARTHUR C. LIVERMORE, a citizen of the United States, and a resident of the borough of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Controlling the Passage of Vehicles Along a Railway, of which the following is a specification.

My invention relates to apparatus for the control of electrical circuits by the movement of the rails of a railway switch.

It is customary in the practice of railway signaling and switching to control the circuits for railway signals by the position of the movable switch rail or rails over which the signals govern traffic. For this purpose it is desirable to provide a circuit controller which is operated directly by the movable switch rail or rails, and which shall be so sensitive as to open the circuits for the signal or signals which it controls when the movable switch rail or rails are accidentally displaced only a small distance, such for example as one-eighth of an inch, from the proper position against the stock rail. Such an accidental displacement might occur, for example, when a car trails through the switch with the movable switch rail or rails set in the wrong position for the passage of such car; or it might be caused by misadjustment of the mechanical connections to the movable switch rail or rails.

An object of my invention is to provide a circuit controller which shall be thus sensitive and which may conveniently be operated in connection with other apparatus usually employed in a railway switch mechanism.

I will describe one form of switch operating apparatus including a circuit controller embodying my invention, and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a plan view showing a railway switch, an operating mechanism therefor, and a circuit controller embodying my invention. Fig. 2 is a plan view showing on an enlarged scale a portion of the operating mechanism shown in Fig. 1, including the circuit controller, the cover for the circuit controller being removed. Fig. 3 is a view showing in side elevation, partly sectioned, the apparatus shown in Fig. 2. Fig. 4 is a view showing in detail a cam device shown in Figs. 2 and 3, and comprised in a circuit controller embodying my invention.

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

Referring now to Fig. 1, the reference character A designates a railway switch, the movable rails of which are operated by a switch operating mechanism B through the medium of an operating rod C. The operating mechanism B may be of a type such as is shown and described in United States Letters Patent No. 329,643, granted to J. T. Hambay, on November 3, 1885, although I do not desire to limit myself to this particular type of mechanism, it being understood that a circuit controller embodying my invention may be applied to any mechanism adapted to operate the movable points of a railway switch. The switch operating mechanism B is in turn actuated by some suitable motive power, here shown as being an electro-pneumatic device D comprising a cylinder 10 whose piston is operatively connected with an operating bar 11 of the switch operating mechanism.

The switch operating mechanism B, as will be readily understood by reference to the hereinbefore mentioned Patent No. 329,643, comprises an "alligator" jaw 13 formed integral with a crank 12, which latter is operatively connected with the switch operating rod C. This alligator jaw 13 is actuated by the longitudinal movements of the bar 11 through the medium of a roller or stud 14 carried by that bar, as shown more clearly in Figs. 2 and 3. The movements which are thus imparted to the movable point rails of the switch are in turn carried back to the mechanism B by a lock-rod E in a usual and well known manner, the rod E being rigidly secured to the point rails.

F designates a circuit controller embodying my invention, here shown as being mounted upon the upper part of the switch operating mechanism B. This circuit controller comprises two sets of oppositely located contact fingers 15 and 16, each set as here shown comprising two pairs of fingers, and each pair comprising an upper and a lower finger. The upper and lower fingers of each pair are adapted to be electrically connected by means of a contacting member

17 carried by the operating bar 11. Although I have here shown only two pairs of contact fingers in each set, I do not wish to limit myself to this specific number. In fact any desired number of pairs may be employed for controlling any desired number of circuits.

It has heretofore been customary to employ a circuit controller of a character such as I have thus far described, for the purpose of giving indications of completed movements of the switch operating mechanisms. That is, when the operating bar 11 reaches either one extremity or the other of its stroke, a set of contact fingers 15 or 16 is closed, thus closing a circuit through an indicating device for indicating to an operator that the movement of the switch operating mechanism has been completed. It has also been customary to employ a separate circuit controlling device, operated independently by the movable switch rails, for the control of signal circuits as hereinbefore explained. One feature of my invention consists in eliminating this independent circuit controlling device, and controlling the signal circuits by means of contact fingers 15 and 16, in the circuit controller F. In the arrangement of contact fingers here shown, I may employ one pair of contact fingers in the set 15, and one pair in the set 16, for the control of the indication circuits, the remaining pair of each set being employed for the control of the circuits for a signal or signals governing traffic over the switch A. When this is the case, and when the controlling circuit for each signal must be closed to move the signal to the "proceed" position, it is evident that the signal can be moved to this position only when the bar 11 is at one extremity of its stroke or the other. In order to control these signal circuits by the actual position of the movable switch rails, and to provide the desired sensitiveness to slight accidental misplacements of these movable rails, I construct the circuit controller F in a manner such as I will now describe.

One contact finger of each pair, here shown as being the upper finger, is mounted in a block 18 or 19 of insulating material, which blocks are rigidly secured to the framework of the circuit controller. The other contact finger of each pair is mounted in a block 20 or 21, the block 20 being carried by one arm of an oscillating member 22, and block 21 being similarly carried by one arm of an oscillating member 23. These oscillating members are rotatably mounted at points 24 and 25 respectively. Adjustably secured to another arm of member 22 is a rod 26, and similarly secured to another arm of member 23 is a rod 27. These rods 26 and 27 are both operatively connected with a rocker arm 28 which is mounted at a point 29 and which coacts with a cam device operatively connected with a switch rail, which cam device I will now describe. Adjacent the lower end of this rocker arm 28 are dogs 31 and 32 adjustably secured to a bar H as by means of bolts passing through slots in the dogs, as shown in Fig. 4. This bar H is operated by the movable rails of the switch, as for example by rigidly connecting it with one of the movable rails as indicated in Fig. 1. The dogs 31 and 32 are provided with projecting cam faces as shown in Fig. 4, and are so arranged that these cam faces engage with the lower end of rocker arm 28 at the extremities of the stroke of the bar H, rotating the rocker arm to substantially the position indicated in Fig. 3. When the rocker arm 28 is in this position, the lower contact fingers are raised to their highest position to engage with the contacting member 17. When, however, the bar H moves to allow the rocker arm 28 to fall away from the cam faces and into a recess 33 between the two dogs, the lower contact fingers move downwardly by gravity, out of engagement with the contacting member 17.

The arrangement and adjustment of the dogs 31 and 32 on the bar H are such that when the movable rails of the switch are in one or the other of their extreme positions against the stock rails, the projecting cam face of one or the other of the dogs 31 or 32 engages the lower end of the rocker arm 28 thereby raising the lower contact fingers into engagement with contacting member 17. If, however, the movable rails are accidentally moved a small distance away from the stock rails, as for example by the means hereinbefore mentioned, the bar H is moved so that the lower end of the rocker arm 28 falls away from the projecting cam face and into the recess 33, thereby opening the lower contact fingers, and breaking all circuits controlled by these fingers.

The arrangement of the lower contact fingers is such that when not acted upon by the projecting cam faces of the dogs 31 and 32 they are held in their downward or open position. As here shown, they are held in this open position by gravity, and are only raised to their upper or closed position by the engagement of the projecting cam face of one of the dogs 31 or 32 with the rocker arm 28.

It will be evident from the foregoing description that any circuits which may be controlled through the contact fingers 15 and 16 will be closed only when the movable switch rails are in their proper position against either one stock rail or the other, and that a very slight displacement of these movable rails from their proper positions will effect an opening of all circuits controlled by the said contact fingers.

Having thus described my invention, what I claim is:

1. In combination, a switch rail, a switch operating mechanism connected therewith, a circuit controller comprising a contacting member operatively connected with the operating mechanism, a contact finger movable into and out of position for engagement with the contacting member and biased to a position out of engagement with the contacting member, and means operated by the switch rail for moving the contact finger into position for engagement with the contacting member when the switch rail is in an extreme position of its stroke.

2. In combination, a switch rail; a switch operating mechanism connected therewith; a circuit controller comprising a contacting member operatively connected with the operating mechanism, an oscillating member, a contact finger carried by said oscillating member, and biased to a position out of engagement with the contacting member, and mechanism interposed between the oscillating member and the switch rail and operated by the switch rail for moving the member into position for engagement of the contact finger with the contacting member when the switch rail is in an extreme position of its stroke.

3. In combination, a switch rail; a switch operating mechanism connected therewith; a circuit controller comprising a contacting member operatively connected with the operating mechanism, an oscillating member, a contact finger carried by said oscillating member, and biased to a position out of engagement with the contacting member, a cam device operatively connected with the switch rail, a rocker arm, one end of which coacts with the cam device, and a link connecting the rocker arm with the oscillating member.

In testimony whereof, I have signed my name to this specification in the presence of two subscribed witnesses.

ARTHUR C. LIVERMORE.

Witnesses:

H. S. BEAKES,

JOHN S. HOLLIDAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."