

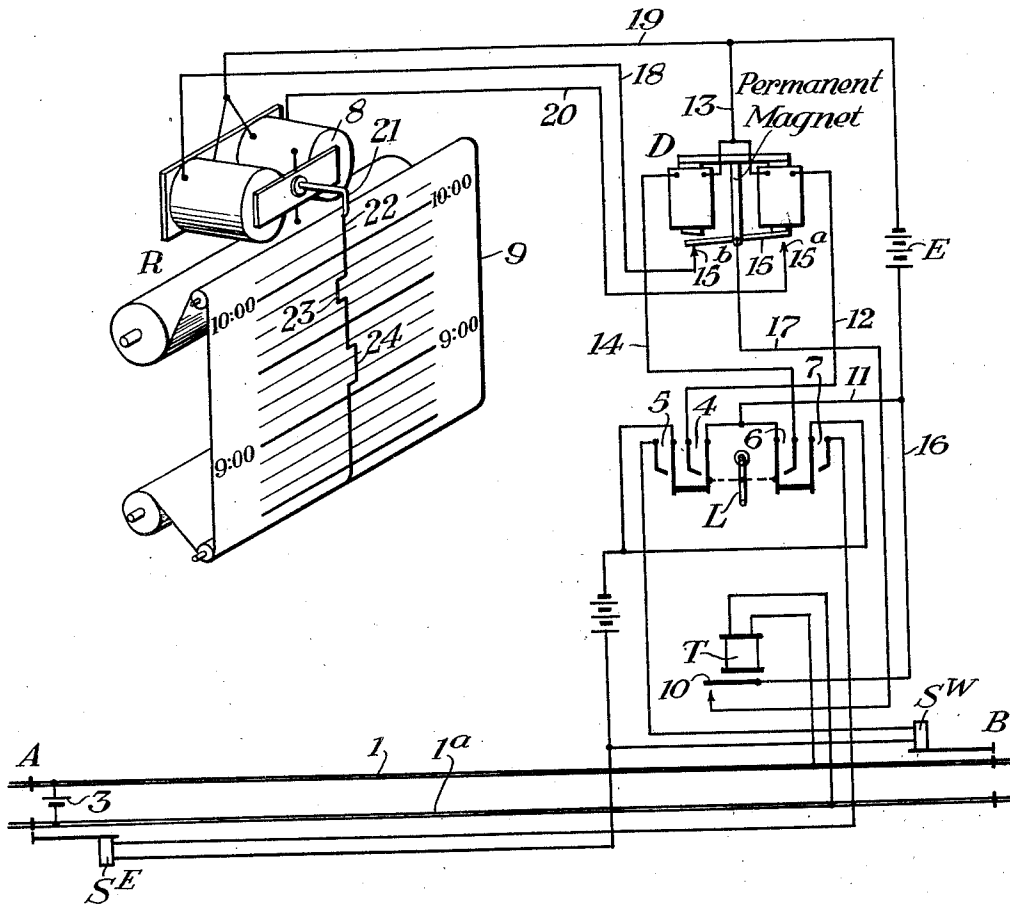
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AUTOMATIC TRAIN RECORDER

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AUTOMATIC TRAIN RECORDER

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My invention relates to apparatus for recording the movements of cars or trains, and has for an object the provision of means for recording the direction of movement of a train as well as the time the train passes through a given section of track.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

10 The accompanying drawing is a diagrammatic view showing one form of apparatus embodying my invention.

Referring to the drawing, the reference characters 1 and 1^a designate the rails of a stretch of track over which traffic moves in both directions, which rails are divided by insulated joints to form a track section A—B. This section is provided with a track circuit comprising a track battery 3 connected across the rails of the track at one end of the section, and a track relay T connected across the rails at the other end of the section. East-bound traffic through the section A—B is governed by a signal S^e, while the west-bound traffic through this section is governed by a signal S^w. These signals are controlled by a manually operable lever L in such manner that when the lever is in the middle position both signals indicate "Stop", whereas, when the lever is in the left-hand position signal S^w indicates "Clear", and when the lever is in the right-hand position signal S^e indicates "Clear." That is to say, signal S^w is provided with a circuit which includes a contact 5 of lever L, which contact is closed when and only when lever L is swung to the left-hand position; and similarly, signal S^e is provided with a circuit which includes a contact 7 of lever L, which contact is closed when and only when the lever is swung to its right-hand position.

The lever L is provided with two other contacts 4 and 6, which are open when the lever is in its middle position but one or the other of which is closed when the lever is swung to its left-hand position or to its right-hand position. These contacts control a directional relay D, and this relay D, together with the track relay T, control a graphic train recorder R.

The directional relay D is of the polarized type, and is so designed that after it becomes de-energized, its polarized contact remains in the position which it last occupied. In other words, after the relay is de-energized, the polarized contact which was last closed remains closed. This relay is energized in the normal or the reverse direction according as lever L is in its right-hand position or its left-hand position, and for this purpose the relay is provided with two windings one or the other of which is energized according to the position of lever L. When the lever is in its right-hand position, the circuit for relay D is from battery E, through wire 11, contact 6, wire 14, one winding of relay D, and wire 13 to battery E. When this circuit is closed, relay D is energized in such direction as to close its normal contact 15—15^a. When the lever L is in its left-hand position, the circuit for relay D is from battery E, through wire 11, contact 4, wire 12, the other winding of relay D, and wire 13 to battery E. When this winding is energized, relay D is operated in such direction as to close its reverse contact 15—15^b.

The recorder R comprises a train chart 9 mounted on rollers and operated by suitable mechanism which forms no part of my present invention. Coacting with this chart is a stylus 21 actuated by a polarized magnet 8. This magnet comprises two windings one or the other of which is energized when track relay T is open, the magnet which is energized being determined by the contact of relay D which is closed at such time. Assuming that relay D is energized in the normal direction, so that its contact 15—15^a is closed, then when track relay T is open, the right-hand winding of magnet 8 is energized, the circuit being from battery E, through wire 16, back contact 10 of relay T, wire 17, normal contact 15—15^a of relay D, wire 20, right-hand winding of magnet 8 and wire 19 to battery E. When this winding of magnet 8 is energized, the stylus 21 moves to the right from its neutral or intermediate position. If directional relay D is energized in the reverse direction, however, then when track relay T is open, the circuit for the left-hand winding

of magnet 8 is closed, this circuit being from battery E, through wire 16, back contact 10 of relay T, wire 17, reverse contact 15—15^b of relay D, wire 18, left-hand winding of magnet 8, and wire 19 to battery E. The stylus 21 is then moved in the left-hand direction from its normal or intermediate position.

The operation of the apparatus is as follows: Normally the manually operable lever L is in its middle position, so that both of the signals are at Stop. Track section A—B is normally unoccupied, so that track relay T is energized, with the result that its back contact 10 is open. Magnet 8 of the recorder R is then de-energized, so that the stylus 21 is in its middle position, with the result that this stylus draws a line in the path 22 on the chart 9. When lever L is swung to the right to Clear signal S^E, the consequent closing of contact 6 causes directional relay D to be energized in the normal direction, so that its contact 15—15^a becomes closed. Then when a train moving toward the right enters section A—B, the shunt formed by the wheels and axles of this train causes track relay T to become de-energized, with the result that the circuit for the right-hand winding of magnet 8 is closed at the back contact 10 of track relay T and the normal contact 15—15^a of relay D. Stylus 21 is then shifted to the right to draw a line in the path 24 on chart 9. Ordinarily, the operator will restore lever L to its middle position as soon as the train has accepted signal S^E, with the result that contact 6 will open and relay D will become de-energized. Owing, however, to the fact that contact 15—15^a remains closed after de-energization of relay D, the circuit for magnet 8 remains closed until the train passes out of section A—B. It follows that the line 24 drawn by the stylus 21 constitutes a record of the time during which the train occupied section A—B.

Similarly, when lever L is swung to the left to clear westbound signal S^W, contact 4 is closed to energized relay D in the reverse direction, so that when a train accepts this signal and enters section A—B, stylus 21 will draw a line in the path 23, thus recording the time during which the train occupied section A—B.

In either case, as soon as the train leaves section A—B, magnet 8 becomes de-energized and the stylus 21 returns to its middle position wherein it draws a line in the path 22 on the chart 9.

Although I have herein shown and described only one form of recording 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:

1. In combination, a section of railway track, a track relay for said section, a signal lever for governing traffic through said section, a directional relay controlled by said signal lever, and a graphic recorder controlled by said track relay and by said directional relay.

2. In combination, a section of railway track, a track relay for said section, a signal lever having right-hand and left-hand positions for governing traffic through said section, a directional relay, means for energizing said directional relay in normal or reverse direction according as said signal lever is in its right-hand or its left-hand position, a graphic recorder having two magnets, and means operating when and only when said track relay is de-energized to supply current to one magnet or the other of said recorder according as said directional relay is in normal or reverse position.

3. In combination, a section of railway track, a track relay for said section, a signal lever having right-hand and left-hand positions for governing traffic through said section, a directional relay having normal and reverse contacts and so arranged that when the relay becomes de-energized the contact which was last closed remains closed, means for energizing said directional relay to close its normal or its reverse contact according as said signal lever is in its right-hand or its left-hand position, a graphic recorder having two magnets, a circuit for one of said recorder magnets including a back contact of said track relay and the normal contact of said directional relay, and a circuit for the other recorder magnet including a back contact of said track relay and the reverse contact of said directional relay.

In testimony whereof I affix my signature.
CARL G. HARWIG.