

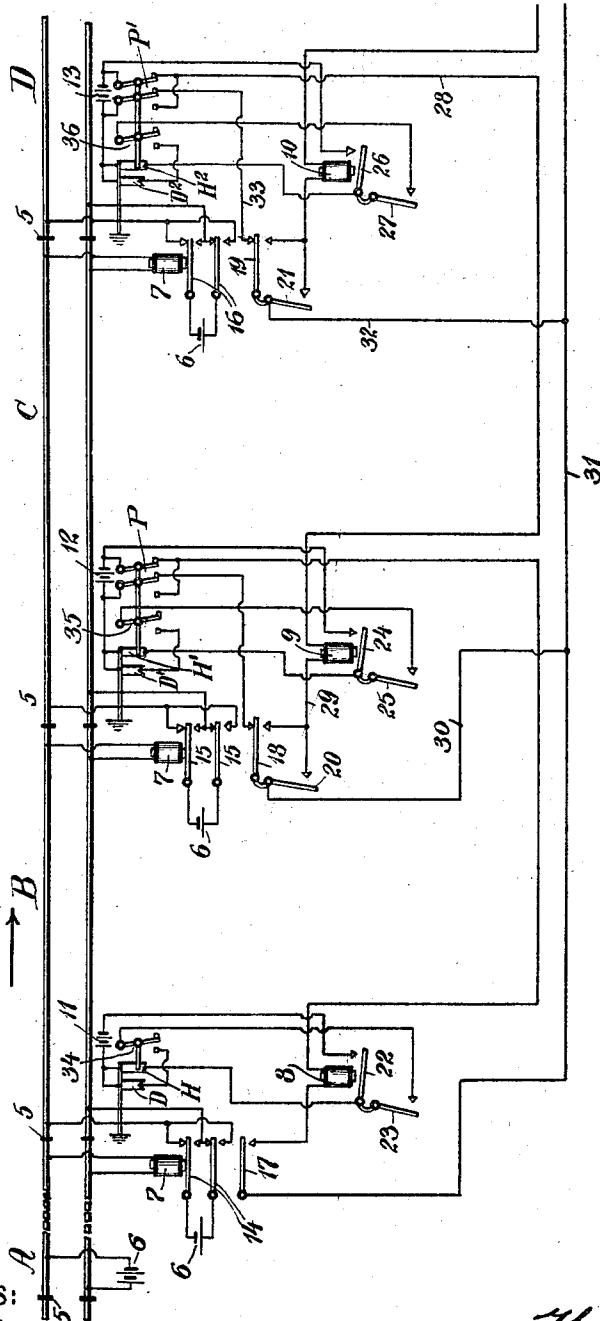
H. A. WALLACE.
RAILWAY SIGNALING SYSTEM.
APPLICATION FILED JUNE 15, 1911.

1,011,291.

Patented Dec. 12, 1911.

3 SHEETS—SHEET 1.

Fig. 1,



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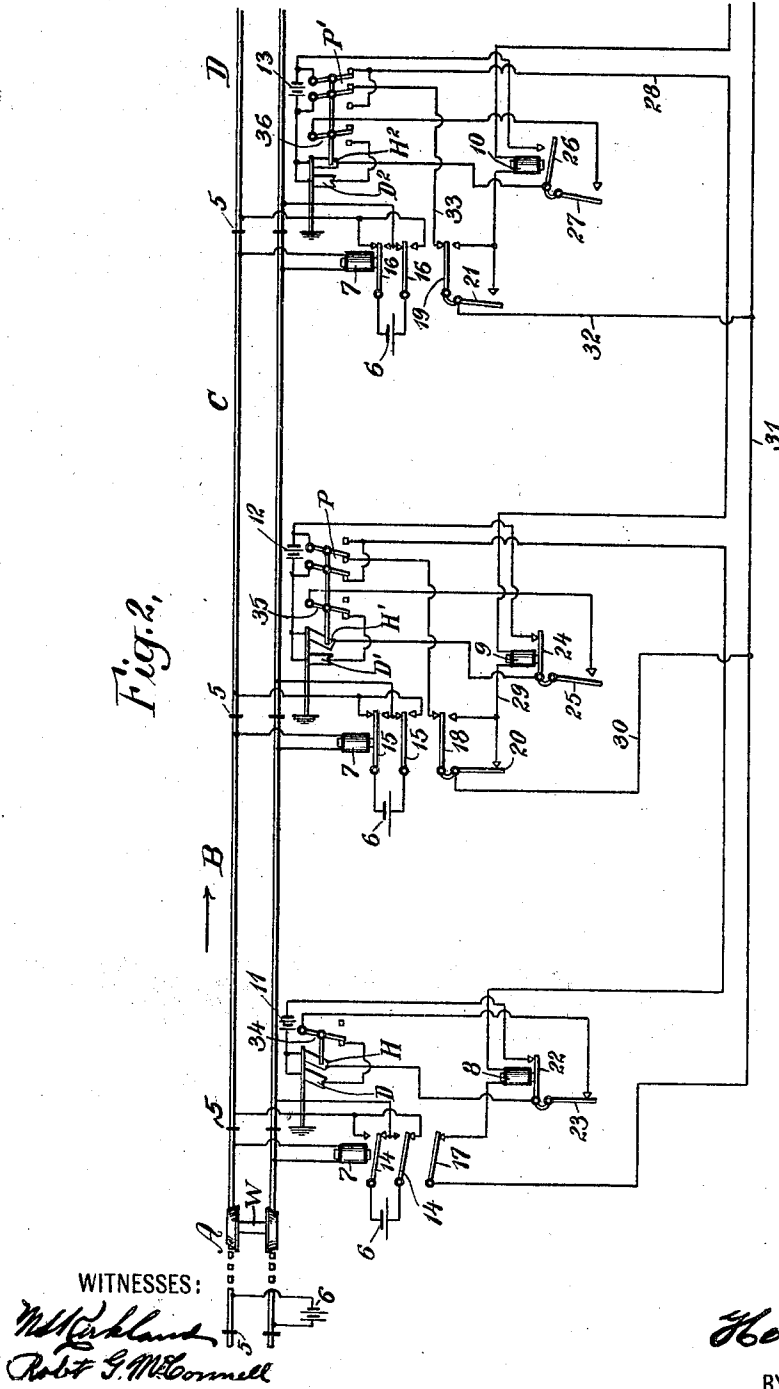
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3 SHEETS-SHEET 2.

Fig. 2.



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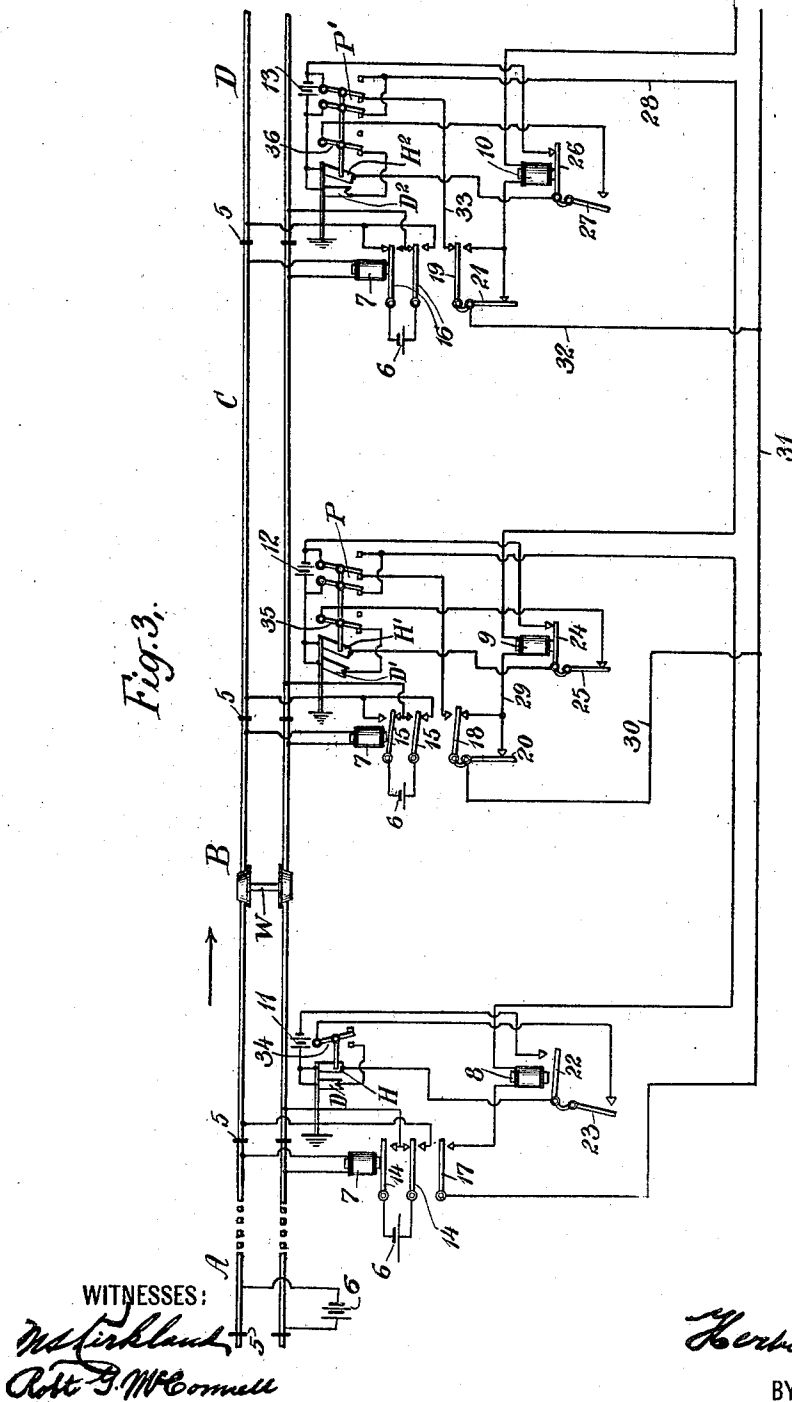
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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RAILWAY SIGNALING SYSTEM.

1,011,291.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed June 15, 1911. Serial No. 633,241.

To all whom it may concern:

Be it known that I, HERBERT A. WALLACE, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Railway Signaling Systems, of which the following is a specification.

My invention relates to automatic railway signaling systems and more particularly to systems in which the signals usually indicate "danger" or "stop," and particularly to what is known in the art as "home and distant" systems.

I will describe a railway signaling system embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view showing a portion of a railway signaling system embodying my invention. Figs. 2 and 3 are views similar to Fig. 1, but showing the position of the parts of the system as affected by the presence of a car or train at two points in the system.

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

Referring now to Fig. 1, I here show a portion of a railway track comprising the first few block sections of a signaling system embodying my invention. Each succeeding block section of the system will be equipped as described for the block sections B, C, D. The railway is divided into the block sections A, B, C and D, etc., in any suitable manner; as here shown, it is divided by means of insulations 5 in both lines or rails, although I do not wish to be limited to this specific means. For block sections B, C, D and each succeeding block section, I provide home signals H, H', etc., and distant signals D, D', etc. As here shown a home and distant signal are mounted on the same supporting pole and located at the entrance end of a block section, although I do not wish to be limited to this particular arrangement. Block section A is not provided with a signal or signals for the reason that it is a preliminary section. For each block section I provide a track circuit comprising as usual the two opposite rail lengths of the block sections (or portion of them) a source of current 6 and a relay 7. As here shown, the source of current 6 is a battery, but I do not wish to be limited

to direct current track circuits, since my invention may be equally well applied to track circuits energized by alternating current, pulsating current, etc. It will be noted that in each block section the source of current is located at the entrance end of the section and the relay at the exit end. For each track circuit after the first (track section A) I provide a pole-changer 14, 15 or 16, by means of which the polarity of the current supplied to the track circuit may be controlled. As here shown, each of these pole-changers comprises armature contacts of the track relay for the preceding track circuit, so that the polarity of the current in each track circuit is controlled by the preceding track circuit. Each of the track relays 7 after the first (block section A) is provided with a polarized armature 20 or 21, which as usual is responsive to changes in polarity of the current in the corresponding track circuit. For each pair of home and distant signals I provide a signal relay 8, 9 or 10, etc., each of which relays comprises a neutral armature 22, 24 or 26, and a polarized armature 23, 25 or 27. The circuit for each home signal is controlled by the neutral armature of the corresponding signal relay, and the circuit for each distant signal by the polarized armatures of the corresponding signal relay. As here shown, the circuit for each distant signal is also controlled by the neutral armature of the signal relay, in accordance with usual practice. The circuit for each distant signal is also controlled by a circuit controller 34, 35 or 36, operated by the home signal on the same pole. Each signal relay is included in a circuit with a source of current and as here shown, this circuit is controlled by a neutral armature contact of the track relay for the corresponding block section, a pole-changer operated by the home signal for the next succeeding block section, and by both a neutral and a polarized armature contact of the track relay for the preceding block section. For example the circuit for signal relay 9 is as follows—from battery 13 through pole-changer P', wire 28, relay 9, wire 29, neutral contact 18 or polarized contact 20 or both, wires 30, 31 and 32 contact 19, wire 33, pole-changer P' to battery 13. It will be noted that the contacts 18 and 20 are in parallel in this circuit, and that therefore the circuit will be closed when 110

either or both of these contacts are closed; also the circuit will be opened when contact 19 is opened by the presence of a car or train in block section C or for other reasons.

5 When the circuit just traced is closed, the neutral armature 24 of relay 9 will be closed and home signal H' will therefore be moved to clear position; and the polarized armature 25 will be closed or open according to the polarity of the current in the circuit as determined by the pole-changer P', so that when the home signal H² is in the clear position and the circuit of relay 9 closed, the distant signal D' will be moved

10 to clear position, and when home signal H² is in danger position the distant signal D' will be in caution position.

Referring now to Figs. 2 and 3, I will explain the operation of the system as affected by the presence of a car or train in block sections A and B.

Referring more particularly to Fig. 2, I here show a pair of wheels and axle W in block section A. Relay 7 of this block section is thereby short-circuited and its armature contacts 14 are opened, thus reversing the polarity of current in the track circuit of block section B. The direction of current flow in the track circuit of the block section B is now such as to close the polarized armature contact 20 of relay 7. When this occurs the circuit of signal relay 9 is closed as hereinbefore explained. Relay 9 being energized, its armature 24 is closed

25 and home signal H' therefore moves to clear position. The short-circuiting of relay 7 of block section A by the wheels W also closes armature contact 17, and the circuit for signal relay 8 is thereby closed; armature contact 22 closes the circuit of home signal H which therefore moves to clear position. Inasmuch as home signal H' is in clear position, the pole-changer P operated thereby is reversed, and the current then flows

30 through signal relay 8 in such direction as to close the polarized armature 23; and since circuit controller 34 is closed by home signal H being in clear position, the controlling circuit for distant signal D is closed and this signal is moved to clear position. Referring now to Fig. 3, as the car or train represented by wheels and axle W moves into block-section B, it short-circuits relay 7 for that block section, opening contact 18 of that relay and thereby opening the circuit of signal relay 8. The neutral armature of this relay is thereby opened and home and distant signals H and D move to danger and caution positions respectively behind the car or train. The short-circuiting of relay 7 also reverses pole-changer 15, thereby closing the polarized armature contact 21 of relay 7 for block-section C. The circuit for signal relay 10 (all of which is not shown)

35 is thereby closed in the same manner as here-

inbefore described for relay 9, and signal H² is placed in clear position. The operation of pole-changer P' by signal H² affects the circuit of signal relay 9 to close the polarized armature 25 of that relay whereby distant signal D' is placed in clear position as hereinbefore explained. 70

It will be noted from the foregoing that when the car or train is in block section A, the polarized contact 20 of relay 7 is closed, and that when the train passes into block section B the neutral contact 18 of the same relay closes a local circuit in parallel with contact 20. In the usual form of polarized relay, the polarized armature does not move to a neutral position when the relay is short-circuited, but the contact pressure is obviously reduced and the resistance of the contact is therefore apt to be increased; and the contact may in some cases be opened by the jarring caused by a passing train. Hence it is advisable to provide for holding the circuit of signal relay 9 closed through the back contact of armature contact 18 in order that it may be assured that this circuit shall be held closed while the car or train is in block section B. Also in case of a switch in block section B it might be necessary to control the circuit of relay 9 through the back contact of armature contact 18 as shown. The operation of the system due to the progress of a car or train through the succeeding block sections would be similar to that hereinbefore explained, hence no further explanation is necessary. 85 90 95 100

Although I have herein shown and described only one form of signaling system embodying my invention, it is understood that various modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention. 105

Having thus described my invention, what I claim is:

1. In a railway signaling system, three successive block sections, a home signal for the third of said block sections and a distant signal for the home signal, a track circuit for each of the said block sections, each including a source of current and a relay, a pole-changer included in the second track circuit and operated by the relay for the first track circuit, a polarized armature included in the relay for the second track circuit and responsive to changes of polarity of the said second track circuit, a signal relay for the home signal, a circuit including said signal relay, a source of current, a contact of the polarized armature and an armature contact of the relay for the third track circuit, a controlling circuit for the said home signal which circuit is governed by the said signal relay, a signal relay for the distant signal and comprising a polarized armature, a cir- 110 115 120 125 130

cuit for the distant signal relay including a source of current, a neutral armature contact of the relay for the second track circuit, and a pole-changer operated by the home signal, and a controlling circuit for the distant signal which circuit includes a contact of the polarized armature of the distant signal relay.

2. In a railway signaling system, a plurality of block-sections, a home and a distant signal for each block section, a track circuit for each block section each including a source of signaling current and a track relay, each of said track relays comprising a neutral armature and a polarized armature, a pole-changer included in each track circuit and operated by the neutral armature of the track relay for the preceding track circuit, a signal relay for each block section, each of which comprises a neutral

armature for the control of the home signal and a polarized armature for the control of the distant signal of the corresponding block section, a pole-changer operated by each home signal, and a circuit for each signal relay, each of which includes a source of current, the pole-changer operated by the home signal for the next succeeding block section, a neutral armature contact of the track relay for the corresponding block section, and a neutral and a polarized armature contact of the track relay for the preceding block section.

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

HERBERT A. WALLACE.

Witnesses:

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ROBT. G. McCONNELL.