

No. 823,646.

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J. B. STRUBLE.
SIGNALING SYSTEM.

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Fig. 1.

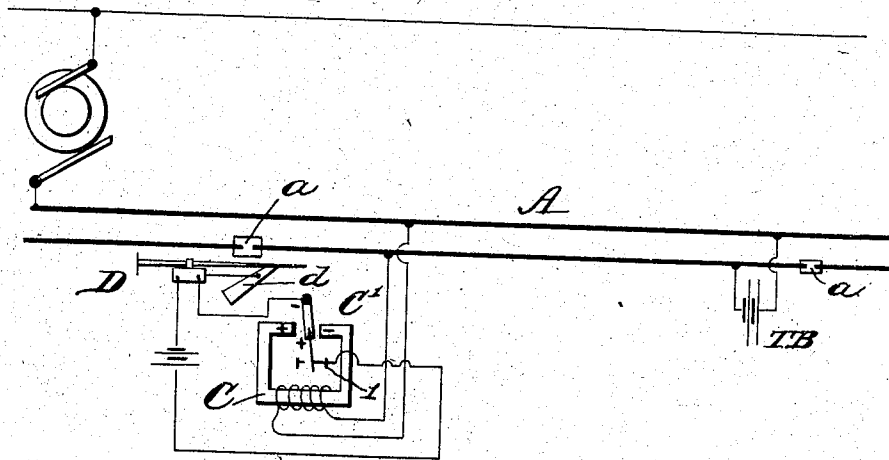
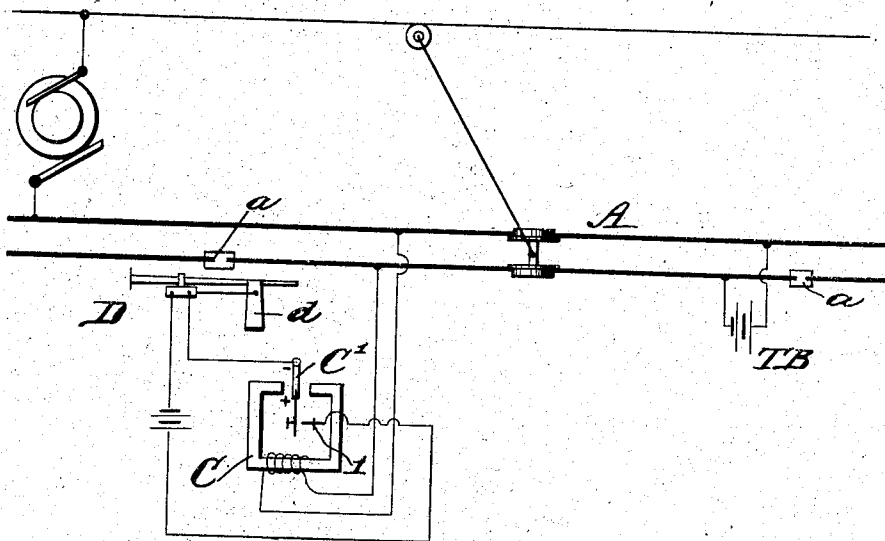


Fig. 2.



WITNESSES:

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SIGNALING SYSTEM.

No. 823,646.

Specification of Letters Patent.

Patented June 19, 1906.

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To all whom it may concern:

Be it known that I, JACOB B. STRUBLE, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Signaling Systems, of which the following is a specification.

My invention relates to a signaling system for railways employing an alternating current as a motive power and a rail of the track as a return for the alternating current in which a closed track-circuit is employed, the usual current in which affects a suitable form of translating device, which device responds to the usual current in the track-circuit in its normal operation. The translating device in turn may control a circuit including an operating mechanism for a signal device comprised in a railway-signal, or the translating device may directly operate the signal.

I will describe a 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 of a signaling system embodying my invention. Fig. 2 is a view similar to Fig. 1, but showing the condition of the circuits when a pair of wheels of a train is on the rails of the track section or block.

Similar letters of reference designate corresponding parts in both of the figures.

In order that my invention may be fully comprehended, I will premise the following: Wherever I herein use the term "railway-signal," I mean to include a visual signal device which by its position relatively to its support by color or by other means of displaying information gives indications of the service conditions of the railway or section of railway which it is intended to govern and a mechanism or apparatus for operating the signal device. Wherever I herein use the term "translating device," I mean any device or apparatus by which electrical current is translated or transformed into some other form of energy, preferably mechanical motion. Wherever I herein use the term "system," "signal system," or "signaling system," I mean such a combination or arrangement of parts and circuits, together with their connections, which enables a railway-signal to

be operated either automatically or manually. In the present invention the railway-signal is intended to be operated automatically and by the passage of a train over the railway or section of railway which it governs.

Referring now to the drawings, A designates a railway which, as usual, consists of two parallel lines of rails secured in position on a suitable road-bed. It is contemplated by my invention that the railway be divided into "blocks" or "sections," and I locate a railway-signal at the beginning of each block or section. The division of the railway into blocks or sections may be accomplished by providing insulation *a* at suitable points in the parallel lines of rails. Generally, it is sufficient to divide but one line of rails into insulated blocks or sections; but in some cases, especially in steam-roads, both rails may be divided. I mean by a "block" or "section" the distance between two signals. In Fig. 1 one of the lines of rails is shown as containing insulations. At one end of the block or section I provide a source of current-supply—as, for example, a battery TB—and electrically connect the poles of the battery to the parallel lines of rails in the block. At the other end of the block and similarly connected to the rails I locate a translating device C, here shown as being in the form of a relay, the electromagnet of which is energized by current passing from the battery TB through the rails. I preferably so form the core of the magnet that both poles may be employed, and this may be accomplished by forming it into a substantially horseshoe shape. The winding of the magnet is so connected to the rails that the direction of current from the battery TB will always cause the poles of the magnet when energized to be of given signs. The armature *C'* is a permanent magnet. It is pivoted at one end and in such a position as to have its free end movable between the pole-pieces. In this construction and adjustment of the armature it will be attracted to one of the two pole-pieces of the magnet so long as any current is in the winding of the magnet. When the current is cut off and the pole-pieces become neutral, the armature *C'* will assume a neutral position. Whenever the armature *C'* is attracted to a predetermined pole of the magnet, it engages a contact-point 1, thus com-

pleting a local circuit through an electromagnetic controlling device of an operating mechanism included in a railway-signal D. The operation of the electromagnetic controlling device is such that when the armature C' is on the contact 1 the operating mechanism causes the signal device d to assume a position or color indicating "safety." When, however, the armature C' is not on the contact-point 1, the operating mechanism will act to move or permits such a movement of the signal device as will indicate "danger." The local circuit and the electromagnetic controlling device are so well known in the art that I will not describe them in detail.

The railway-signal D, as usual, comprises a signal device d, here shown as being of the semaphore type, the blade d being employed to give indications during the light of the day, and the usual lens carried in the spectacle in combination with a lamp is employed to give indications at night. The mechanism or apparatus for moving the signal device may be any of the well-known types.

The operation of the system just described will be readily understood. So long as the usual current from the battery flows uninterruptedly through the relay-magnet the polarized armature will be attracted to a predetermined pole-piece to hold the circuit of the railway-signal closed, thereby causing it to indicate "safety." Should, however, the current through the relay be interrupted, as by being short-circuited through a pair of wheels and axle occupying the block, the armature C will move away from the contact 1 and open the circuit of the electromagnetic device of the operating mechanism, causing or permitting the signal device to give a danger indication. The foregoing is what I term the "normal" operation of the translating device responding to the usual current in the track-circuit. Should an extraneous alternating current flow through the magnet at the same time as the direct current from the battery, the position of the armature of the translating device will not be effected thereby. Should an alternating current flow through the magnet when the battery TB is short-circuited, it would have no effect to shift the armature and close contact 1, because the pole-pieces would become alternately positive and negative at a rate which is too rapid for the polarized armature, due to its inertia, to respond. It will be seen, therefore, that my system is particularly adapted for use on electric railways where alternating current is used as a motive power for the cars and the return for the motive-power alternating current is through one of the track-rails.

What I claim as my invention is—

1. The combination with a railway employing alternating current as a motive

power and one of the rails of the track as a return for the alternating current, of an alternating-current supply for the railway, and a signaling system comprising a circuit which includes the return-rail and an insulated section of the other track-rail, a direct-current supply for such circuit, and a translating device also in said circuit and affected by the direct current therein to control a signal device which gives service indications of the railway or section of railway.

2. The combination with a railway employing alternating current as a motive power and one of the rails of the track as a return for the alternating current, of an alternating-current supply for the railway, and a signaling system comprising a circuit which includes the return track-rail and an insulated part of the other track-rail, a direct-current supply for said circuit, and a translating device having a movable part to control a circuit which also includes an operating mechanism of a railway-signal, said translating device being affected by the absence or presence of the direct current in its circuit in operating the movable part to control the signal-circuit.

3. The combination with a railway employing alternating current as a motive power and one of the rails of the track as a return for the alternating current, of an alternating-current supply for the railway, and a signaling system comprising a circuit which includes the return track-rail and an insulated part of the other track-rail, a direct-current supply for said circuit, a translating device included in said circuit as to have the direct current give it a fixed polarity, and a polarized armature which is under the influence of the polarity of the translating device, and an operating mechanism of a railway-signal controlled by said polarized armature.

4. In a signaling system for use on electric railways employing alternating current as a motive power, and a rail for the return thereof, the combination of a series of block-sections, a closed track-circuit for each block-section which includes a portion of both track-rails, a source of direct current for each track-circuit, a translating device included in each track-circuit, and means in each track-circuit for preventing alternating current effectively operating the translating device.

5. In a signaling system for use on electric railways employing alternating current as a motive power, and a track-rail for the return, the combination of a series of block-sections, a track-circuit for each block-section, a source of direct-current supply for each track-circuit, a translating device included in each track-circuit, and means for preventing alternating current operating the translating device to control a railway-signal.

6. A signaling system comprising a source of alternating current, a source of direct cur-

rent, a common return for both currents, motor-vehicles actuated by the alternating current, signaling devices actuated by the direct current, and means controlled by the movement of the motor-vehicle for controlling the movement of the signaling devices.

7. A signaling system comprising a source of alternating current, a source of direct current, a common return for both currents, motor-vehicles actuated from the source of alternating current, signaling devices actuated from the source of direct current, and means carried by the moving vehicles and adapted to shunt the direct current around signaling devices.

8. In an electric-railway system, a source of alternating power-current, a power-circuit, signaling circuits formed by the track and electrically separated from each other, a direct-current supply for each of the signal-

ing-circuits, and signaling devices controlled from the signaling-circuits.

9. In an electric-railway system, a source of alternating power-current, a power-circuit in which the track of the railway forms a part, signaling-circuits formed in part by the track, a source of direct current for each signaling-circuit, and a relay also in each signaling-circuit responsive to the direct current of its signaling-circuit to control a signal device and not responsive to the flow of alternating currents to control the signal device.

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

JACOB B. STRUBLE.

Witnesses:

GEO. E. CRUSE,
W. L. McDANIEL.