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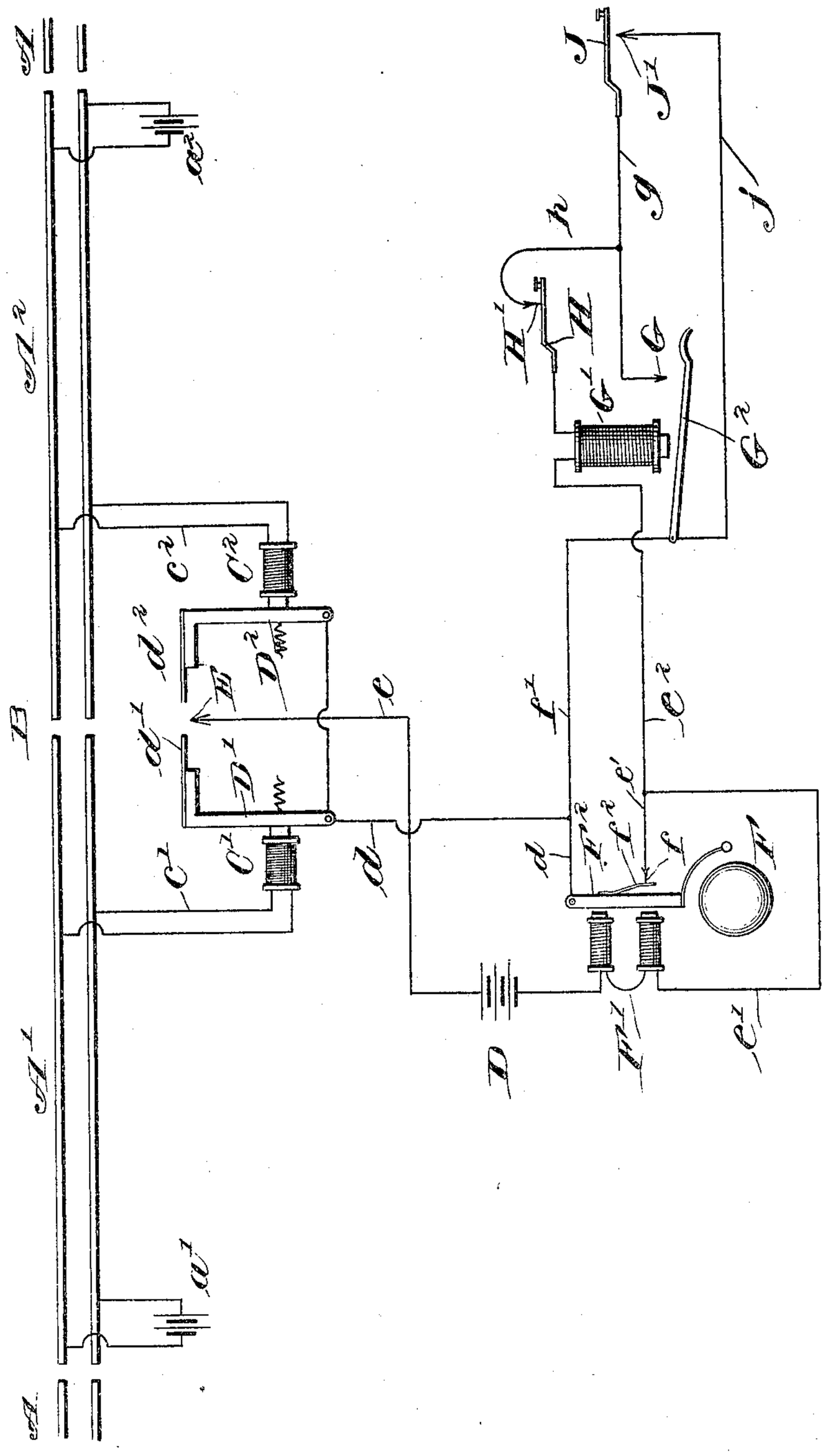
E. W. VOGEL.

SELF RESTORING SIGNAL CONTROLLING DEVICE.

APPLICATION FILED JULY 23, 1901.



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UNITED STATES PATENT OFFICE.

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SELF-RESTORING SIGNAL-CONTROLLING DEVICE.

No. 804,180. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed July 23, 1901. Serial No. 69,377.

To all whom it may concern:

Be it known that I, EUGENE W. VOGEL, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Self-Restoring Signal-Controlling Devices; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, which forms a part of this specification.

My invention relates in general to circuit-controlling devices, and more particularly to that class of such devices which are adapted to control the circuit of a railroad-signal.

Alarm-bells or similar signals which are actuated by circuits formed in part by insulated sections of the track ordinarily operate as long as a train occupies one of the insulated track-sections. This is frequently undesirable—as, for instance, when a train is required to remain on the insulated section of the track for a considerable length of time doing local work. Unnecessary expense is thus incurred, owing to the consumption of the batteries, and annoyance results from the continuous and needless sounding of a bell or the operation of other forms of signal devices.

The object of my invention is to provide simple and reliable means for rendering a signal inoperative while a train occupies an insulated track-section, such means, however, permitting the return of the parts of the signal mechanism automatically to their normal positions as soon as the train leaves the insulated track-section, thereby permitting the operation of the signal when another train occupies the insulated section of the track forming part of the circuit controlling the signal. Means are also provided whereby the signal after having been discontinued may again be rendered operative while the train occupies the track-section.

My invention therefore, generally stated, consists in means for rendering operative or inoperative a railroad-signal which has been automatically operated by a train occupying a given insulated section of the track and at the same time permitting the signal mechanism to be automatically restored to its normal position upon the departure of a train from the insulated track-section.

The invention will be more fully described hereinafter with reference to the accompanying drawing, in which the same is diagrammatically illustrated as embodied in a convenient and practical form.

Reference-letter A indicates a railroad-track of usual construction, while reference characters A' and A^2 indicate insulated sections of the track located on either side of a crossing B or other point at which it is desired to locate a signal. The rails of the section A' are connected, by means of leads, with a battery a', while the rails of the section A^2 are connected by leads with a battery a^2. Leads c' connect a magnet C' with the rails of the section A', while leads c^2 connect a magnet C^2 with the rails of the track-section A^2. Armatures D' and D^2 are located adjacent to the magnets C' and C^2, respectively, so that the magnets when energized retain the armatures in the positions indicated in the drawing. The armatures are provided with spring-contacts d' and d^2, which are adapted to engage a fixed contact E when the respective magnets C' and C^2 are deënergized. The contact E is connected by a lead e to a battery D, the other pole of which is connected to the magnet F' for actuating a suitable signal—such, for instance, as the gong F in the drawing. A lead e' connects the magnet F' with a fixed contact-point f. A spring-contact f^2 is supported upon an armature F^2, which is located adjacent to the magnet F', so as to be attracted thereby. A lead d connects the armature F^2 with both of the armatures D' and D^2.

The apparatus above described operates as follows: Whenever a train approaching the crossing B enters the insulated track-section A', the battery a' is short-circuited, and the magnet C' is therefore deënergized. The armature D' falls either by gravity or by the action of a tension-spring and engages the fixed contact E, thereby closing the signal-circuit and operating the signal. The circuit is as follows: contact E, lead e, battery D, magnet F', lead e', spring-contact f^2, armature F^2, lead d, armature D', and spring-contact d' to the contact E. If a train approaches the crossing B from the opposite direction, as soon as it enters the insulated section A^2 the battery a^2 will be short-circuited and the magnet C^2 deënergized, thereby permitting the armature D^2 to fall so that its spring-contact d^2 engages the fixed contact E. The circuit which is then completed for operating the

signal is the same as that previously traced out, except that the circuit is completed through the armature D^2 and its spring-contact d^2, which engages the fixed contact E. It is evident that the signal would be operated as long as either of the batteries a' or a^2 was short-circuited by a train occupying either of the insulated track-sections A′ or A^2. In order that the signal may be rendered inoperative while the signal-circuit is closed owing to a train occupying one of the track-sections, I extend a lead f' from the lead d and connect to such lead f' an armature G^2. Another lead e^2 is also extended from the lead e' and includes a magnet G′, located in operative relation with the armature G^2. The lead e^2 continues beyond the magnet G′ and is provided with a fixed contact G, adapted to be engaged by the armature G^2 when the latter is in the position which it assumes when the magnet G′ is energized. When it is desired to render inoperative the signal, the armature-lever G^2 is lifted manually into engagement with the fixed contact G, thereby including the magnet G′ in parallel with the armature F^2 and its spring-contact f^2. The armature G^2 may also be lifted into engagement with contact G, as subsequently described, by depressing the switch J into contact with the point J′, thereby including the magnet G′ in shunt around the make-and-break device. The circuit which energizes the magnet G′ is traced as follows: lead f' to armature G^2, to fixed contact G, to magnet G′, to lead e^2 and thence to lead e'. The magnet G′ is thereby energized and retains the armature G^2 in position to contact with G. It is thus evident, although the signal-circuit might continue closed, the signal would not sound, inasmuch as the make and break between the contact f and the spring-contact f^2 would no longer interrupt the circuit, owing to the armature F^2 being held in engagement with the magnet F′, the latter being continuously energized. If it is desired to again render the signal operative while a train occupies either of the track-sections, and consequently closes the signal-circuit, the armature G^2 may be disengaged from the contact G, thereby breaking the circuit through the magnet G′, so that the signal-circuit is interrupted by the make and break through the contact f and the spring-contact f^2.

I preferably locate in the lead f' between the magnet G′ and the contact G a normally closed switch comprising a spring-lever H and a fixed contact H′, so that the circuit through the magnet G′ may be broken at such point without necessitating the forcible disengagement of the armature G^2 from the magnet G′.

The leads f' and e^2 are preferably continued beyond the armature G^2 and contact G, as shown at g and j, and located at the terminals of these extensions of the leads is a circuit-controller comprising a spring-lever J and fixed contact J′, so that the circuit through the magnet G′ may be completed and the armature G^2 attracted by closing the circuit between the fixed contact J′ and the spring-lever J.

It should be noted that after the armature G^2 has been lifted into engagement with the contact G the shunt around the make-and-break device will continue as long as the signal-circuit continues closed, but that upon the circuit being broken at H H′ or at G G^2 the armature G^2 will fall away from the contact G, and thereby break the shunt and again render the signal operative, owing to the make-and-break at the contact f f^2. It should also be noted that whenever the signal-circuit is interrupted at the contact E owing to the track-sections A′ and A^2 being no longer occupied by a train the armature G^2 will fall away from the contact G, and thereby restore the signal-circuit to its normal condition, so that the occupation of either of the track-sections A′ or A^2 by another train will at once render the signal operative.

By locating the means for rendering the signal operative or inoperative in a shunt around the signal it is only necessary to provide two leads extending from the signal-circuit, thereby economizing the use of the wire conductor necessary to connect to the signal-circuit a means for rendering the signal operative or inoperative.

It is evident that other means than an interlocking relay such as shown might be employed to control a signal-circuit in order to operate the signal when either insulated track-section is occupied by a train, and I therefore do not wish to limit myself to any particular means for automatically controlling the signal-circuit.

While I have described more or less precisely the arrangement of the circuit and of the parts included therein, I do not wish to be understood as limiting myself to the arrangement illustrated, as I contemplate changes therein and the substitution of equivalents for the parts disclosed, as circumstances may suggest or render expedient, without departing from the spirit of my invention.

I do not claim in this application, broadly, means for rendering operative or inoperative a railroad-signal which has been automatically operated by a train occupying a given insulated section of the track, such means being automatically restored to its normal position upon the departure of the train from the insulated track-section, as such subject-matter is claimed generically in my pending application, Serial No. 67,800, filed July 10, 1901.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a railroad signal system, the combination with a signal, of means for actuating the

signal comprising an electromagnet and a make-and-break device, a circuit including said electromagnet and make-and-break device, means for automatically closing said circuit when a train occupies a predetermined section of track, and means for shunting said make-and-break device to effect an uninterrupted energization of the magnet and thereby discontinue the signal.

2. In a railroad signal system, the combination with a signal, of means for actuating the signal comprising an electromagnet and a make-and-break device, a circuit including said electromagnet and make-and-break device, means for automatically closing said circuit when a train occupies a predetermined section of track, said means automatically opening said circuit when said track-section is unoccupied by a train, a circuit-controller for closing a shunt around said make-and-break device to effect an uninterrupted energization of the magnet, said controller being automatically opened thereby breaking said shunt when the signal-circuit is broken.

3. In a device of the character described, the combination with a circuit, of a make-and-break device therein, an electromagnet in said circuit the current through which is interrupted by said make-and-break device, leads connected to said circuit at each side of said make-and-break device, a second magnet located in one of said leads, an armature connected to the other lead and adapted to engage a terminal of the first lead when in contact with the pole of the second magnet and thereby include said second magnet in parallel with said make-and-break device and in series with said first magnet, and maintain said connection by the armature being attracted by the second magnet, whereby the circuit is completed around said make-and-break device, substantially as described.

4. In a railroad signal system, the combination with a signal, of means for actuating the signal comprising an electromagnet and a make-and-break device for interrupting the current passing through the magnet, a circuit including said magnet and said make-and-break device, means for automatically closing said circuit to operate the signal when a train occupies a predetermined track-section, and means for shunting said make-and-break device and thereby discontinuing the signal.

5. In a railroad signal system, the combination with a signal, of means for actuating the signal comprising an electromagnet and a make-and-break device for interrupting the current passing through the magnet, a circuit including said magnet and said make-and-break device, means for establishing a shunt around said make-and-break device, a second magnet located in said shunt, an armature also located in said shunt and adapted to complete said shunt when in contact with the pole of said second magnet thereby effecting the uninterrupted energization of the first magnet and the consequent discontinuance of the signal.

6. In a railroad signal system, the combination with a circuit, of means located therein for operating a signal, comprising an electromagnet and a make-and-break device, leads connected to said circuit at each side of said make-and-break device, a second magnet located in one of said leads, an armature connected to the other lead, said leads being continued beyond said second magnet and armature, a controller adapted to electrically connect said leads whereby the second magnet is connected in parallel with said make-and-break device and thereby energized to draw the armature into electrical contact with said first lead.

7. In a railroad signal system, the combination with a circuit, of means located therein for operating a signal, leads connected to said circuit at each side of said signal-operating means, a magnet located in one of said leads, an armature connected to the other lead, said leads continued beyond said magnet and armature, a controller adapted to electrically connect said leads whereby the magnet is connected in parallel with said signal-operating means and thereby energized to draw the armature into electrical contact with said first lead, substantially as described.

8. In a railroad signal system, the combination with a circuit, of signal-operating means therein comprising an electromagnet and a make-and-break device, leads connected to said circuit at each side of said signal-operating means, a second magnet located in one of said leads, a normally closed switch also located in said lead, an armature connected to the other lead, a normally open switch located at the ends of said leads and whereby the second magnet may be connected in parallel with said make-and-break device by closing said normally open switch and thereby energized to draw said armature into electrical contact with said first lead to maintain the circuit closed around said make-and-break device until said signal-circuit is interrupted, substantially as described.

9. In a railroad signal system, the combination with a circuit having a fixed terminal, of a plurality of armatures electrically connected with the other terminal of said circuit, each of said armatures adapted to engage said fixed terminal, magnets adapted when energized to hold said armatures out of contact with said fixed terminal, track-circuits normally energizing said magnets, insulated track-sections forming parts of said circuits each adapted when occupied by a train to deenergize the magnet connected therein and thereby close the signal-circuit, means in said signal-circuit for operating the signal comprising an electromagnet and a make-and-break device, a circuit-controller connected in parallel with said make-and-break device,

means for automatically opening said circuit-controller when the signal-circuit is restored to its normal condition, substantially as described.

10. In a railroad signal system, the combination with a circuit, of a battery therein, means for automatically closing said circuit when a train occupies an insulated section of track, a magnet energized by said circuit to operate the signal, a make-and-break device in said circuit actuated by said magnet, leads connected to said circuit at each side of said make-and-break device, a second magnet located in one of said leads, an armature connected to the other lead and adapted to engage a terminal of the first lead when in contact with the pole of the magnet and thereby include said second magnet in parallel with said make-and-break device and in series with said first magnet, whereby the signal is discontinued and the consumption of the battery economized, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

EUGENE W. VOGEL.

Witnesses:

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CLARA C. CUNNINGHAM.