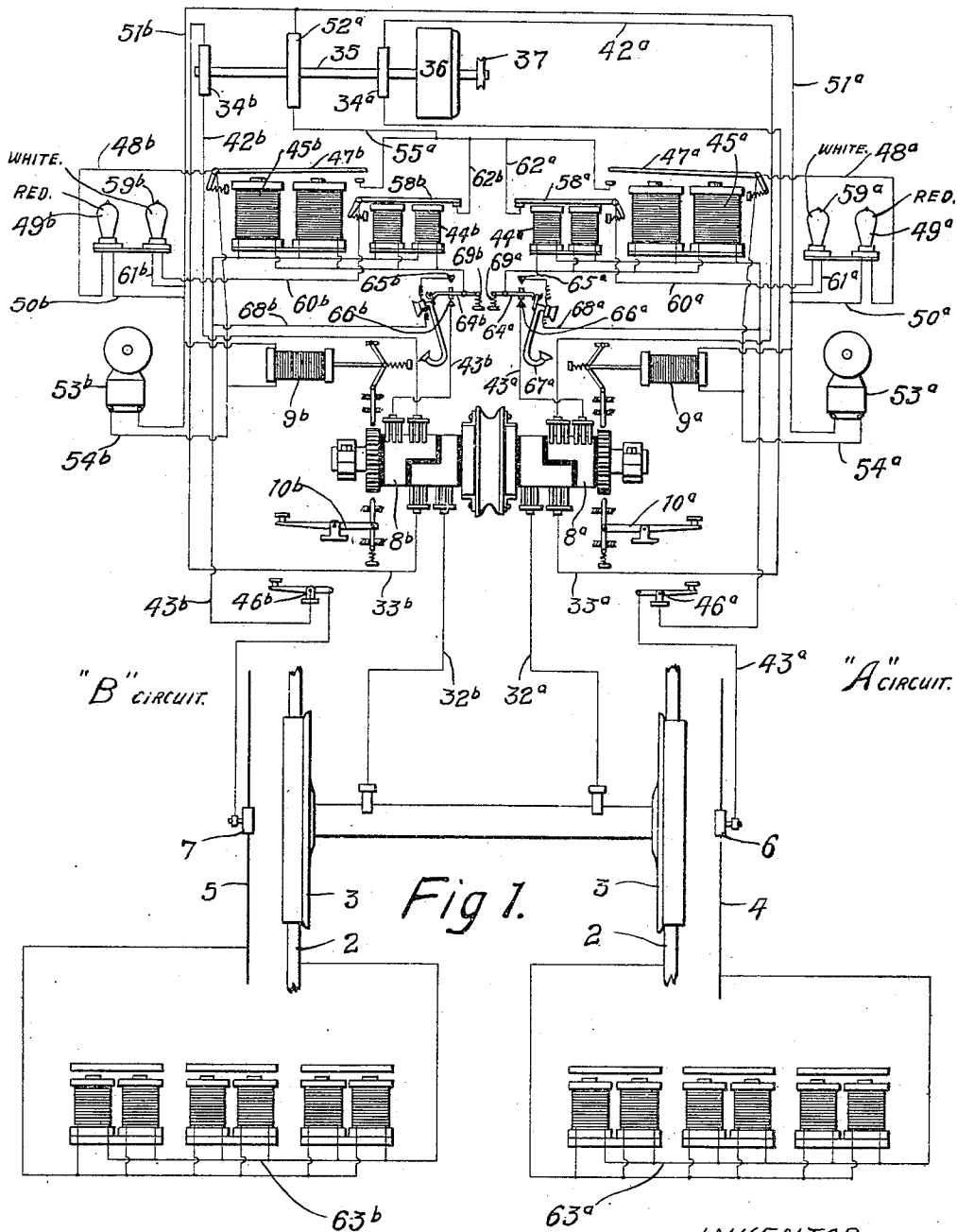


No. 839,505.

PATENTED DEC. 25, 1906.

E. McCLINTOCK.  
ENGINEER'S ALARM.  
APPLICATION FILED SEPT. 20, 1905.

2 SHEETS—SHEET 1.



WITNESSES  
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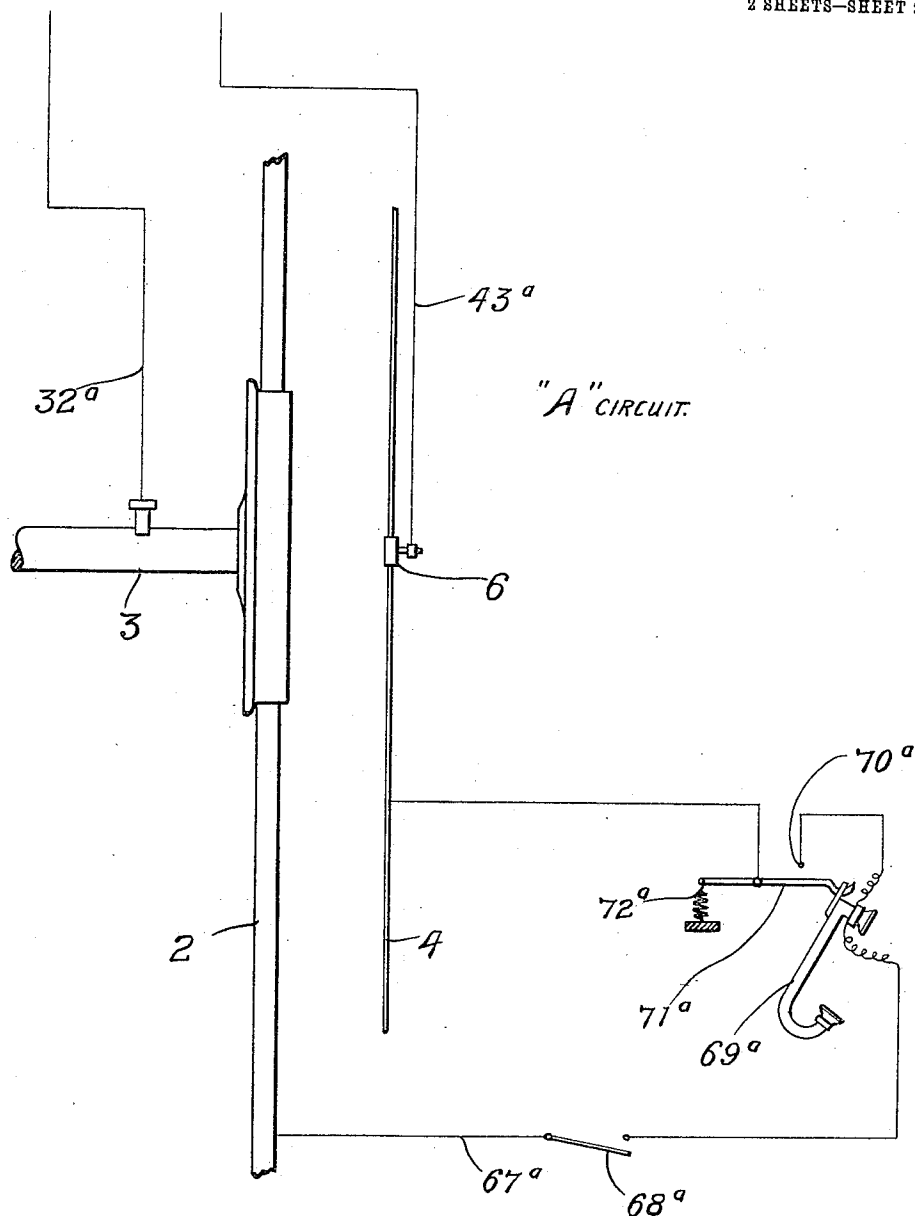


Fig 2.

WITNESSES.  
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# UNITED STATES PATENT OFFICE.

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## ENGINEER'S ALARM.

No. 839,505.

Specification of Letters Patent.

Patented Dec. 25, 1906.

Application filed September 20, 1905. Serial No. 279,260.

*To all whom it may concern:*

Be it known that I, EDWARD McCLINTOCK, of Merriam Park, Ramsey county, Minnesota, have invented certain new and useful  
5 Improvements in Engineers' Alarms, of which the following is a specification.

My invention relates to automatic signal and alarm devices used in connection with railway systems to warn the engineer of a  
10 train of the proximity of another train within a certain predetermined distance; and the object I have in view is to simplify and improve the mechanism shown and described in Letters Patent of the United  
15 States, issued to me September 8, 1903, No. 738,468, and the mechanism described in a certain pending application filed by me May 16, 1904, Serial No. 208,178.

The invention consists generally in providing circuit-closers or electromagnets of different winding connected in parallel instead of in series, to the end that a low-voltage generator may be used with sufficient  
20 current to flow through the track-circuit and without danger of grounding.

Further, the invention consists in providing a telephone in the track-circuit to enable the engineer of one train to communicate with the engineer of an approaching  
30 train.

Further, the invention consists in providing relays having different windings and connected in parallel in the track-circuit and adapted to close local signal or alarm  
35 circuits in a station or at the end of a block.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a diagrammatic view of a signal and alarm embodying my invention. Fig. 2 is a diagrammatic view illustrating a local telephone-  
45 circuit in the track-circuit for use of the operator at a way-station.

In the drawings I have shown two independent pole-changing circuits, which I will designate as A and B, one connected with  
50 the main and auxiliary rails on one side of the track and the other with the corresponding rails on the other side. Each circuit is

a duplicate of the other, and their operation is substantially the same, and the circuits correspond to those shown and described in  
55 my pending application above referred to, and a detailed description of the mechanism and its operation will not be necessary in this case except in so far as the mechanism relates to and is affected by the improve-  
60 ments which I have incorporated in the system.

The main-track rails are represented by the numeral 2, and the wheels of a truck by  
numeral 3.

4 and 5 are auxiliary rails arranged parallel with the track-rails and insulated from them and from each other. The auxiliary rails are divided into sections or blocks with  
65 alternating joints, the rails on one side being in the A circuit and the corresponding rails on the other side in the B circuit. Two independent track-circuits are thus provided, as described in my former patent. Contact-  
70 shoes 6 and 7 are provided on the auxiliary rails, one for each track-circuit.

A pole-changing device is provided for each circuit, and as this has already been described in detail in my pending applica-  
80 tion I will in this case indicate these pole-changers by reference-numerals 8<sup>a</sup> and 8<sup>b</sup> to designate the track-circuits to which they belong, reference being had to my pending case for a detailed description of the changers.

The mechanism employed in the two circuits A and B being similar I will describe the A circuit only, indicating the parts with reference-figures by exponent *a* and the corresponding parts in the other circuit by the same figures with the exponent *b*. An automatic locking device 9<sup>a</sup> for the pole-  
85 changer is provided and a key-controlled locking device 10<sup>a</sup> is also provided in the A circuit. These devices are similar to those described in my pending application. A  
90 wire 32<sup>a</sup> connects the pole-changer with the truck 3, and a wire 33<sup>a</sup> connects the pole-changer with a generator 34<sup>a</sup>, mounted on a shaft 35, that is driven by a turbine 36 and provided with a pulley 37. The other pole  
100 of the generator 34<sup>a</sup> is connected by a wire 42<sup>a</sup> with the other side of the pole-changer. A similar generator is provided on the other end of the shaft 35 in the B circuit and des-

ignated by reference-letter *b*. The pole-changer in the A circuit is connected by a wire 43<sup>a</sup> with electromagnets 44<sup>a</sup> and 45<sup>a</sup> in parallel as distinguished from the series arrangement of the magnets in my pending application. From these magnets the wire passes to a telegraph-key 46<sup>a</sup> and from thence to the contact-shoes 6. The magnet 45<sup>a</sup> is provided with an armature 47<sup>a</sup>, connected by a wire 48<sup>a</sup> with a red light 49<sup>a</sup>. A wire 50<sup>a</sup> leads from the light 49<sup>a</sup> to a wire 51<sup>a</sup>, that is connected to one pole of a generator 52<sup>a</sup> on the shaft 35. The wire 51<sup>a</sup> is also connected to a bell 53<sup>a</sup>, and a wire 54<sup>a</sup> leads from the bell back to the armature 47<sup>a</sup>. A wire 55<sup>a</sup> leads from the other pole of the generator 52<sup>a</sup> to a contact-point in the path of the armature 47<sup>a</sup>. The magnet 44<sup>a</sup> has an armature 58<sup>a</sup>, connected with the white light 59<sup>a</sup> by a wire 60<sup>a</sup>, and a wire 61<sup>a</sup> leads from the said white light to the wire 51<sup>a</sup>. A wire 62<sup>a</sup> leads from the wire 55<sup>a</sup> to a contact-point in the path of the armature 58<sup>a</sup>. A plurality of differently-wound relays 63<sup>a</sup> are provided between the auxiliary rail 4 and the contiguous main-track rail 2. These relays are in place of the resistance-coil described in my pending application and are connected in parallel, as shown, and may be located in a station or at the end of the block and used to control local circuits having visual or audible signals. (Not shown.) These relays being connected in parallel, the resistance will be reduced to a minimum, and a number of them can be utilized without materially affecting the current in the track-circuit.

The magnets or circuit-closers 44<sup>a</sup> and 45<sup>a</sup> are differently wound, as described in my former application, and as they are connected in parallel I am able to use a generator of low voltage and avoid danger of grounding the track-circuit. The magnets 45<sup>a</sup> are wound with a larger wire and have fewer turns than the magnet 44<sup>a</sup>, and as the current is directly proportional to the electromotive force of the generator and as the attractive power of the magnets is proportional with a given current to the number of ampere-turns of the winding it follows with a low-voltage generator, the magnets 44<sup>a</sup> having finer wire and a greater number of turns than the magnet 45<sup>a</sup>, will be normally energized and the good-order or white-light signal-circuit normally closed until such time as the short-circuit is formed by a metal connection between the rails or by the presence of another generator in the same circuit on a train approaching from either direction. At such time the current will be augmented sufficiently to energize the magnet 45<sup>a</sup> and close the red-light or alarm circuit. At all other times the magnet 45<sup>a</sup> will not be affected sufficiently by the passage of the current to close the red-light circuit, and as

the magnets are connected in parallel the current will not be cut down or weakened by its passage through a circuit which is normally open.

In connection with this system I prefer to provide means which will allow telephonic communication between approaching trains in the same block. This means consists of a pivoted lever 64<sup>a</sup>, arranged between contact-points 65<sup>a</sup> and 66<sup>a</sup>, the latter being connected with the wire 43<sup>a</sup> and the lever 64<sup>a</sup> being attached to the wire 43<sup>a</sup> near the circuit-closers. The circuit through the lever 64<sup>a</sup> and the contact-point 66<sup>a</sup> is normally closed by the weight of the combined telephone receiver and transmitter 67<sup>a</sup>, which is connected by a wire 68<sup>a</sup> with the point 65<sup>a</sup> and with the wire 43<sup>a</sup>. When the telephone receiver and transmitter are released from the lever, a spring 69<sup>a</sup> will raise the said lever into contact with the point 65<sup>a</sup> and close the circuit through the receiver and transmitter and allow the engineers of the two trains to talk with one another. As soon as the receiver is hung on the lever again the current will be broken through the point 65<sup>a</sup> and reestablished through the point 66<sup>a</sup> and the lever 64<sup>a</sup>. With this apparatus the engineer of a train will through the burning of the white light know that the system is in working order, and whenever the red light flashes he will be instantly warned of the approach of another train in the same block, and he can immediately establish telephonic or telegraphic communication with the engineer of that train, and all danger of head or rear end collisions will be avoided.

In Fig. 2 I have illustrated a telephone-circuit for the convenience of the operator at a way-station. 67<sup>a</sup> represents the circuit, which is provided with a switch 68<sup>a</sup>, normally open to direct the current through the relays 63<sup>a</sup>, but adapted to be closed by the operator to cut out the relays and short-circuit the current through the telephone receiver and transmitter 69<sup>a</sup>, the contact 70<sup>a</sup>, the pivoted bracket 71<sup>a</sup>, which when the receiver is removed will through the action of the spring 72<sup>a</sup> engage the contact-point and close the circuit.

With this apparatus the operator at a way-station can communicate with the engineer of a train passing the station in either direction.

The invention covered by this application is distinguished from the one in Serial No. 208,178 by the circuit-closers having different windings and the relays in the track-circuits, both of which do not appear in my former application.

I claim as my invention—

1. The combination, with a track-circuit having a pole-changer, of good-order and alarm circuits having signals, said good-order circuit being normally closed and said alarm-

circuit normally open, a relay in said track-circuit, and sources of electrical energy for said circuits.

2. The combination, with a track-circuit 5 having a pole-changer, of good-order and alarm circuits having signals, said good-order circuit being normally closed and said alarm-circuit normally open, a plurality of relays having different windings provided in said 10 track-circuit, and sources of electrical energy for said circuits.

3. The combination, with a track-circuit having a pole-changer, of good-order and alarm circuits having signals, said good-order 15 circuit being normally closed and said alarm-circuit normally open, a plurality of relays having different windings and connected in parallel with said track-circuit, and sources of electrical energy for said circuits.

4. The combination, with a track-circuit 20 having a pole-changer, of good-order and alarm circuits having signals, circuit-closers for said good-order and alarm circuits having different windings and connected in parallel 25 with said circuits, said good-order circuit being normally closed and said alarm-circuit normally open, and sources of electrical energy for said circuits.

5. A train-alarm comprising a good-order 30 circuit having a signal, an alarm-circuit also having a signal, circuit-closers for said good-order and alarm circuits of different windings and connected in parallel, said good-order circuit being normally closed and said 35 alarm-circuit normally open, a pole-changer in circuit with the rails and said closers, a source of electrical energy for said circuits, a current normally passing through said alarm-circuit being insufficient to operate 40 said closer and close said alarm-circuit until connected with a similar circuit on a train that is approached within a certain predetermined distance moving in the same or opposite direction, substantially as described.

6. A train-alarm comprising a track-circuit 45 having a train-carried pole-reversing means, of good-order and alarm circuits having signals, said good-order circuit being normally closed and said alarm-circuit normally open, 50 a telephone-circuit in said track-circuit and sources of electrical energy for such circuits.

7. The combination, with a track-circuit having a pole-changer, of good-order and alarm circuits arranged in pairs, circuit- 55 closers having different windings in parallel with said good-order and alarm circuits, said good-order circuit being normally closed and

said alarm-circuit normally open, and sources of electrical energy for said circuits.

8. The combination, with a track-circuit 60 having a pole-changer, of good-order and alarm circuits arranged in pairs, said good-order circuit being normally closed and said alarm-circuit normally open, a plurality of relays having different windings connected 65 in parallel with said track-circuits, and sources of electrical energy for said circuits.

9. The combination, with the main track-rails, of conductors, relays having different windings connected in parallel with the rails 70 and said conductors on each side of the track, white-light or good-order circuits normally closed, red-light or alarm circuits normally open and having suitable closers, means in circuit with said rails and said alarm-closers 75 for closing said alarm-circuits upon the approach of another motor moving in the same or opposite direction, and sources of electrical energy for said circuits.

10. The combination, with a track-circuit 80 having a train-carried pole-reversing means, of a normally closed good-order circuit, and a normally open alarm-circuit, said circuits having suitable signals, circuit-closers for said circuits having different windings and 85 connected in parallel therewith, and sources of electrical energy for said circuits.

11. The combination, with a track-circuit, of normally closed good-order and normally open alarm circuits having signals, circuit- 90 closers for said good-order and alarm circuits having different windings and connected in parallel with said circuits, and sources of electrical energy for said circuits.

12. The combination, with a track-circuit, 95 of normally closed good-order and normally open alarm circuits having signals, a relay in said track-circuit, circuit-closers for said good-order and alarm circuits having different windings and connected in parallel with 100 said circuits, and sources of electrical energy for said circuits.

13. The combination, with a track-circuit having a train-carried pole-reversing means, of normally closed good-order and normally 105 open alarm circuits having signals, a relay in said track-circuit, and sources of electrical energy for said circuits.

In witness whereof I have hereunto set my hand this 8th day of September, 1905.

EDWARD MCCLINTOCK.

Witnesses:

RICHARD PAUL,  
C. MACNAMARA.