(No Model.)

2 Sheets—Sheet 1.

H. C. HORSTMANN.

RAILWAY SIGNAL.

No. 459,633. Patented Sept. 15, 1891.

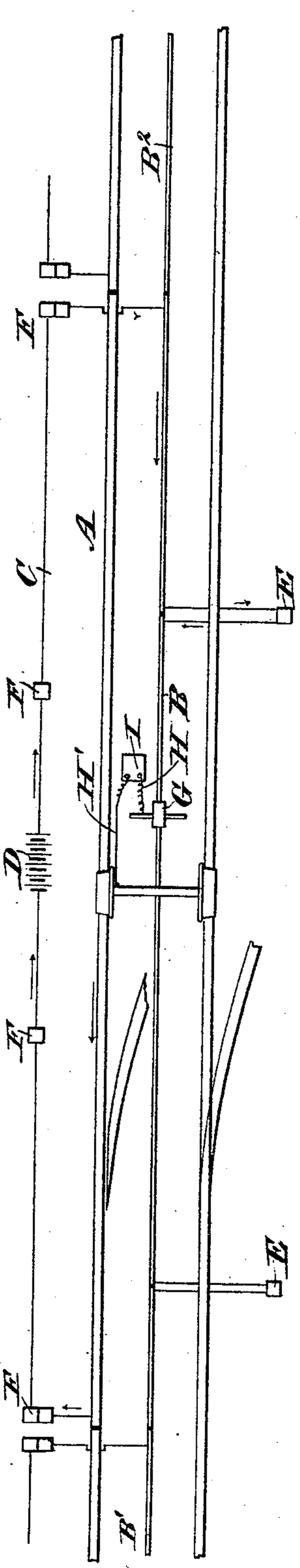

Fig. 1.

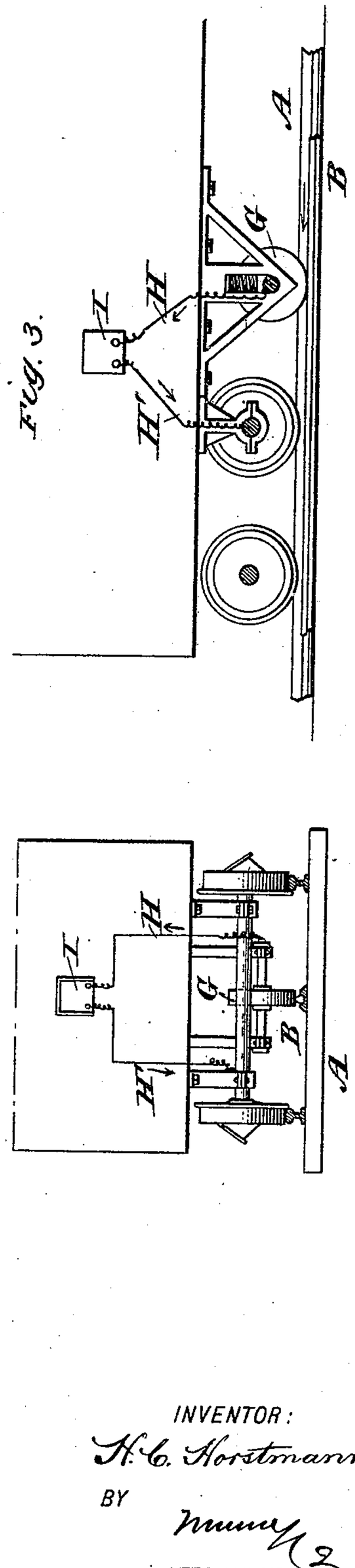

Fig. 3.

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

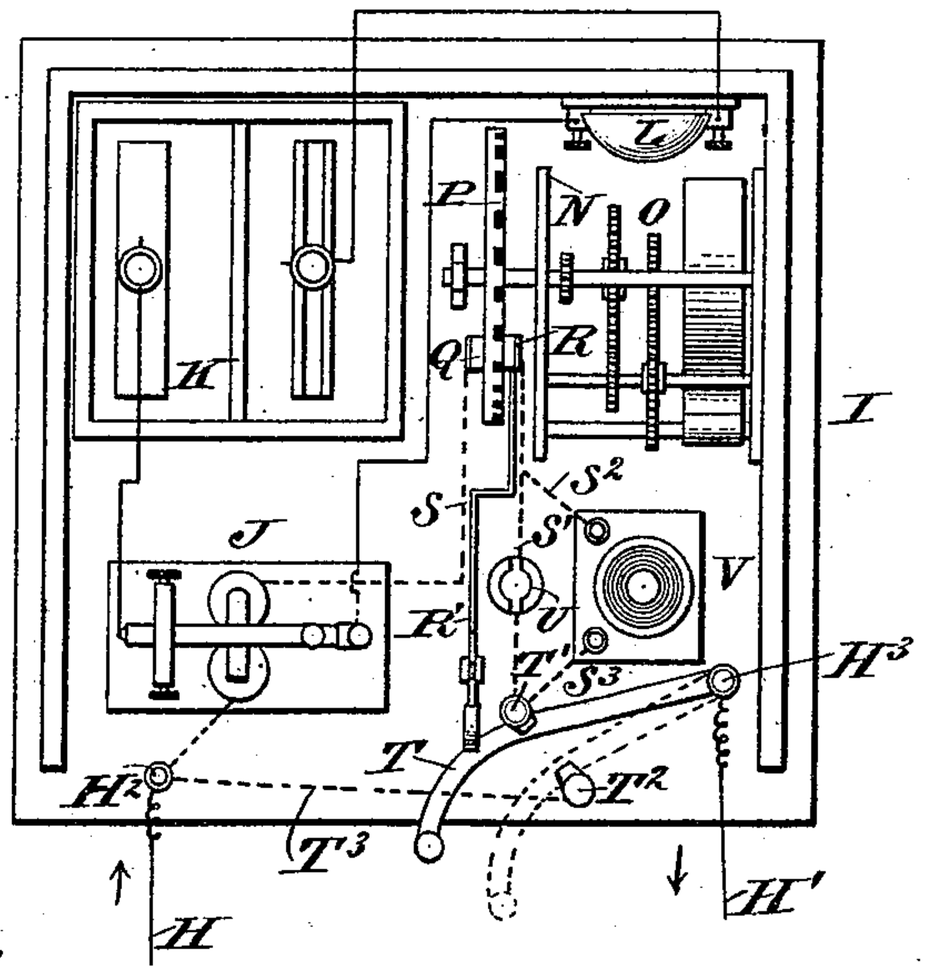


Fig. 5.

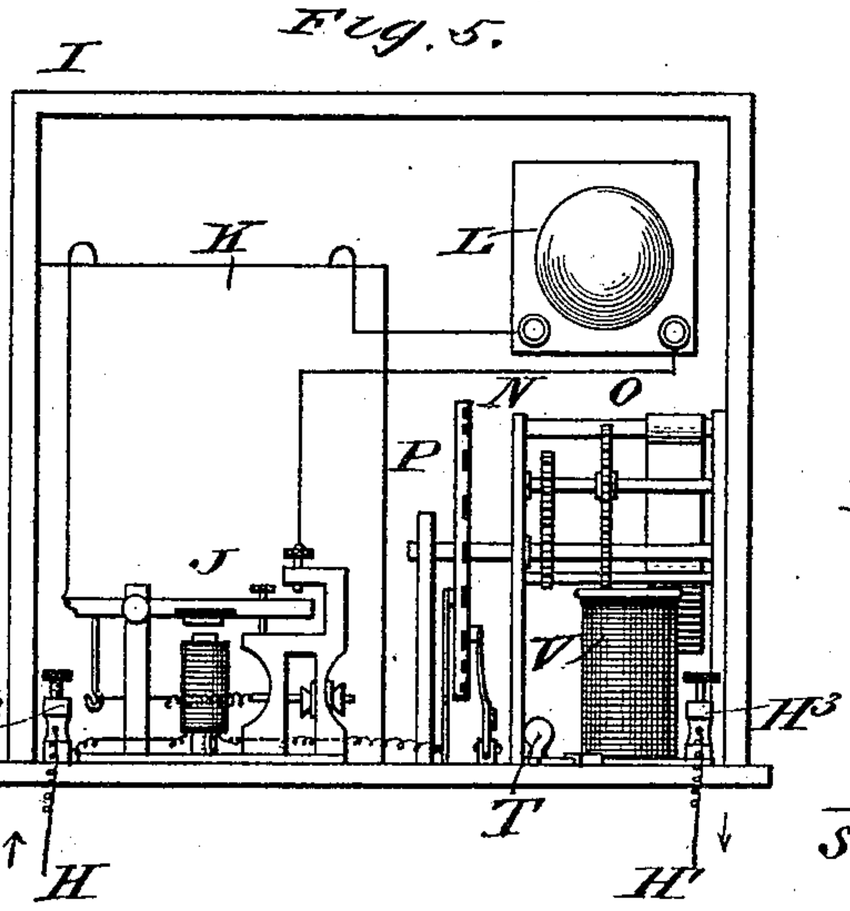


Fig. 6.

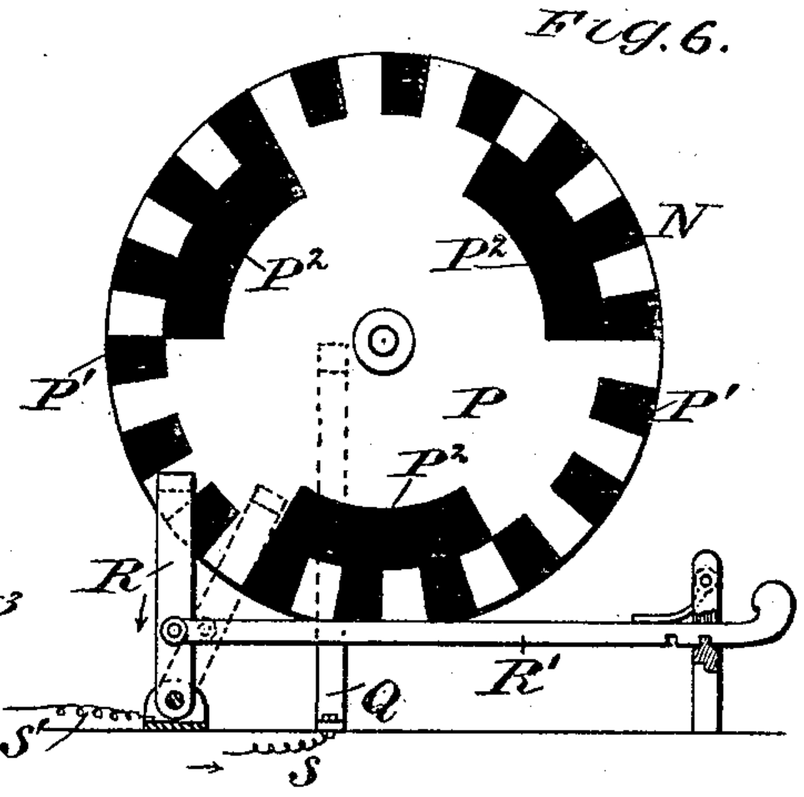
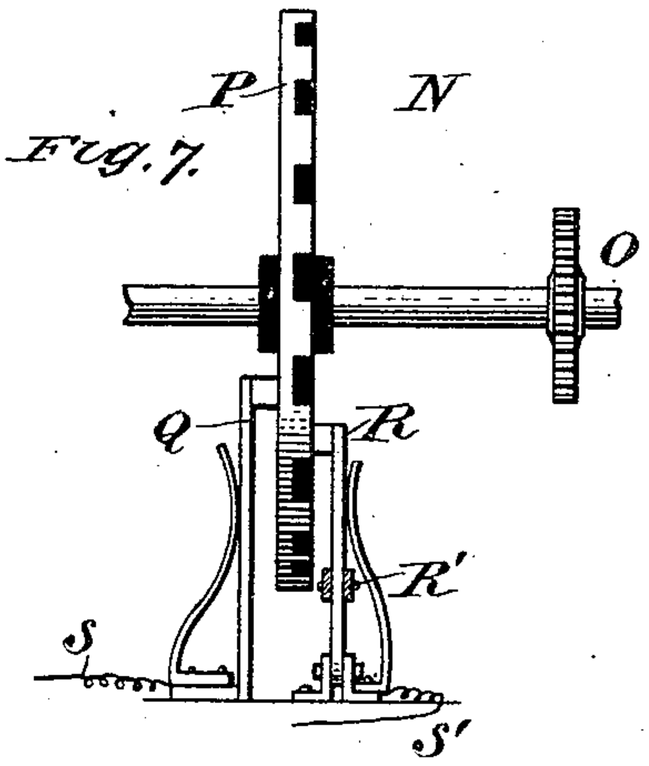


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY C. HORSTMANN, OF NAPERVILLE, ILLINOIS.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 459,633, dated September 15, 1891.

Application filed May 15, 1891. Serial No. 392,923. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. HORSTMANN, of Naperville, in the county of Du Page and State of Illinois, have invented a new and Improved Railway-Signal, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved electric signal for railway block systems arranged in such a manner that a train entering a block causes the display of visible signals throughout the entire block, the signals indicating the direction of the train.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement as applied. Fig. 2 is an enlarged end elevation of the improvement as applied. Fig. 3 is a sectional side elevation of the same. Fig. 4 is an enlarged plan view of the signaling apparatus in the cab. Fig. 5 is a side elevation of the same. Fig. 6 is an enlarged face view of the circuit-breaker, and Fig. 7 is an end elevation of the same.

Between the rails of the track A are arranged conductors B B′ B^2, &c., one for each block of the system. One end of each conductor is connected with a wire C, leading to a battery D, the other end of the wire being connected with one of the track-rails. (See Fig. 1.) Each conductor B B′ B^2, &c., is connected with one or more signals E, arranged on one side of the track A, and similar signals F are arranged in the circuit-wire C on the opposite side of the track, the said signals being of any approved construction, actuated by an electric current passing through the conductor and the circuit-wire.

In order to establish connection between the respective conductor B and its circuit-wire, a contact-wheel G is provided, journaled under the cab of the locomotive and held in contact with the said conductor, one end of the axle of the wheel G being connected by a wire H with a signaling apparatus I, located in the cab of the locomotive and connected by a wire H′ with one of the axles of the car-wheels, so that by the said axle and car-wheels and one of the rails of the track connection is made with the end of the circuit-wire C, as previously mentioned. The signaling apparatus I (shown in detail in Figs. 4, 5, 6, and 7) is arranged in a suitable casing, and contains binding-posts H^2 and H^3, connected with the wires H and H′, above mentioned. The binding-post H^2 is connected with a sounder J of any approved construction, and connected with a battery K, held in the casing of the signaling apparatus I. The battery K is connected with an alarm L, which by a return wire is also connected with a sounder J, as plainly shown in Fig. 4.

In order to break the circuit of the sounder at suitable intervals, a circuit-breaker N is provided set in motion by a suitable clock-work O, carrying on its main shaft a circuit-breaking wheel P, revolved by the said clock-work. One face of the wheel P is in contact with a spring-pressed arm Q, while the opposite face is likewise engaged by a spring-pressed arm R, pivoted at its lower end and connected with a lever R′ under the control of the operator for changing the position of the pivoted arm R. The face of the wheel P on which the arm R is held in contact is formed near its periphery with a series of insulating-plates P′, arranged in a circle so that the arm R alternately comes in contact with the conducting-surface of the wheel P and the insulating-plates P′. A second set of insulating-plates P^2 are arranged on this face of the wheel P, the second set P^2 being longer, so that the alternate contact of the arm R takes place at longer intervals than on the insulating-plates P′. By operating the lever R′ the pivoted arm R may be moved out of contact with the insulating-plates P′ and in contact with the plates P^2, and vice versa. The contact-arm Q is connected by a wire S with the magnet of the sounder J, while the arm R is connected by a wire S′ with a switch-post T′, adapted to be connected or disconnected with a switch-lever T, pivoted on the binding-post

H^3 of the wire H′. The switch-lever T may be moved in contact with the switch-post T^2, connected by a wire T^3 with the binding-post H^2, so that the current passes directly from the wire H, binding-post H^2, wire T^3, post T^2, lever T, and binding-post H^3 to wire H′, to complete the circuit in the apparatus I.

In the wire S′, previously mentioned, is arranged a switch U for passing the circuit through a resistance-coil V, of any approved construction, whenever it is desired, the said resistance-coil being connected by a wire S^2 with that part of the wire S′ leading to the arm R and by a wire S^3 with the post T′. Ordinarily the circuit passes from the arm R and wire S′ to the binding-post T′ and from the latter by the lever T to post H^3 and wire H′ to establish the circuit.

When the switch U is changed for the purpose hereinafter mentioned, the circuit passes from the arm R through the resistance-coil V to the binding-post T′ and by lever T and binding-post H^3 to the wire H′.

The arrows in the several figures indicate the direction of the electric current. In ordinary running the electric current passes from wire H and binding-post H^2 to sounder J and by wire S to arm Q, in contact with the circuit-breaking wheel P, revolved by the clock-work O. Now whenever the wheel P in revolving passes the arm R, with its insulating-plates P′ or P^2, then the circuit is broken, so that the bell L is sounded. Trains moving in one direction have their arms R in contact with the plates P′, thus alternating their signals—say every second—while the train moving in the opposite direction has its arm R in contact with the plates P^2, so that their signals alternate every five seconds. Trains using the shunt for short alternation include in their circuit the resistance-coil V, while such trains as use long alternation close the switch U, so as to shunt the resistance-coil V. The armature of the sounder J is part of the circuit passing through the battery K, and is intended to be closed when no current is passing through the magnets of the sounder, and is to be broken when the current passes through the latter. It will be seen that while the conducting part of the circuit-breaking wheel P is between the spring-pressed arms Q and R the current is made and all signals E and F are displayed, while the bell L of the apparatus I is silent, and vice versa. Thus the engineer can compare visible signals along the track with audible signals in the cab of the locomotive. In case two trains move in an opposite direction and meet in any block of the railway system, then the one having the long alternations of signals and no resistance will for five seconds deprive the other having resistance in his circuit of the current, during which five seconds the bell L on the second train will ring. By this the engineer in the second train receives a signal that another train is coming toward him, and consequently closes immediately the switch-lever T, which, as it offers no resistance whatever through wire T^3, deprives all other trains of the electric current, thereby causing the apparatus I in the other train to sound the bell L, at the same time causing a display of a steady signal throughout the block. Should a break occur in a train, then the party in charge of the train simply places a piece of wire or other conductor of electricity across the rail, and the respective conductors B B′ B^2, &c., so as to display steady signals and ring the bell in the cab of any train which may be in the block.

A proper code of signals will be arranged so that engineers in different trains can signal one to the other. For instance, signals alternating every second will indicate "westbound trains." Signals alternating every five seconds will indicate "eastbound trains." Steady signals, as above mentioned, will indicate "danger," caused either by a stopping train or a train broken in two. The latter will be accompanied by steady ringing of the bell in the cabs. In case the line is out of order the bells will ring, but no signals will be displayed. In case of one train following another when either engineer notices any discrepancy between the displayed signal and the audible signals then the switch-lever T is opened so as to break the circuit entirely to enable the engineer to see whether another train is on the same block or not.

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

1. In an electric signal for railway block systems, the combination, with an electric circuit for each block, the same including the conducting-rail B^2 laid between the ordinary track-rails, of the wire C, battery D, and signals F, arranged alongside the track, the signals E, also in circuit with the sections of said rail B^2, the locomotive contact-wheel, which runs on the latter, and the signaling apparatus carried in the locomotive-cab, which is in circuit with said wheel and one of the track-rails, as shown and described.

2. In an electric signal for railway block systems, the combination, with an electric circuit for each block, the same including the conducting-rail B^2 laid between the ordinary track-rails, of the wire C, battery D, and signals F, arranged alongside the track, the signals E, also in circuit with the sections of said rail B^2, the locomotive contact-wheel, which runs on the latter, and the signaling apparatus carried in the locomotive-cab, which is in circuit with said wheel and one of the track-rails and includes a sounder, alarm, and the circuit-breaking wheel N, clock-work for revolving the latter, spring-pressed arms, and means for shifting the position of one of said arms, as shown and described, to operate as specified.

3. In an electric signal for railway block

systems, a circuit-breaker comprising a revoluble disk or wheel formed on one face with one or more sets of insulating-plates, spring-pressed arms in contact with the faces of the said disk, one of the said arms being pivoted and adapted to engage the said plates, and a lever for shifting the said pivoted arm for moving the latter in contact with either a long or short set of said insulating-plates, substantially as shown and described.

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Witnesses:
JAMES J. HUNT,
FRANK W. HUNT.