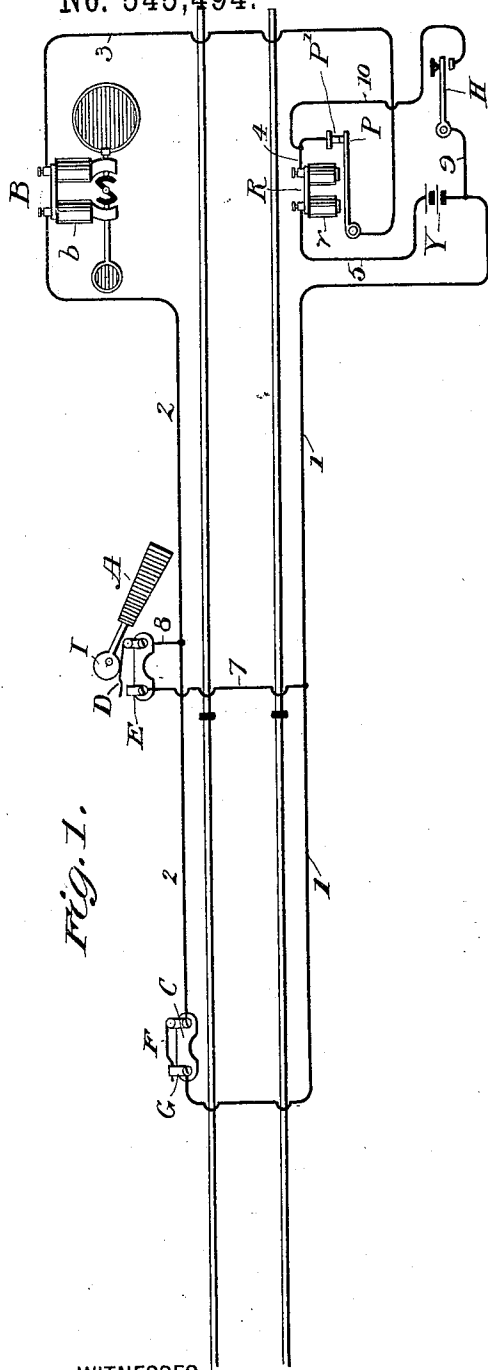


A. W. HALL.
RAILWAY BLOCK SIGNAL SYSTEM.

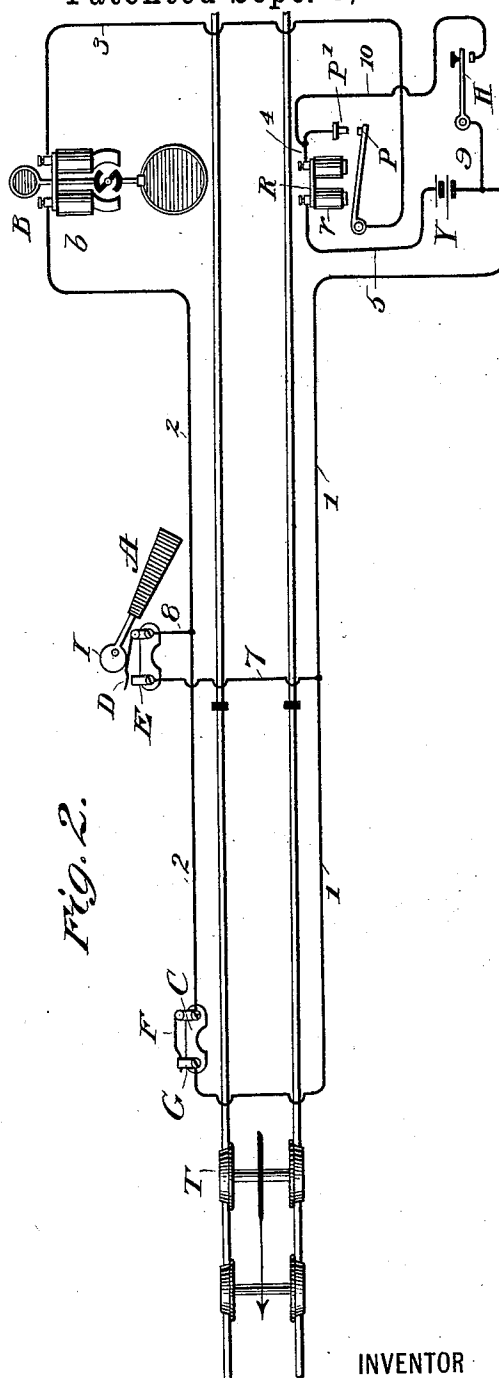
No. 545,494.

Patented Sept. 3, 1895.



WITNESSES:

Paul S. Orr.
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INVENTOR

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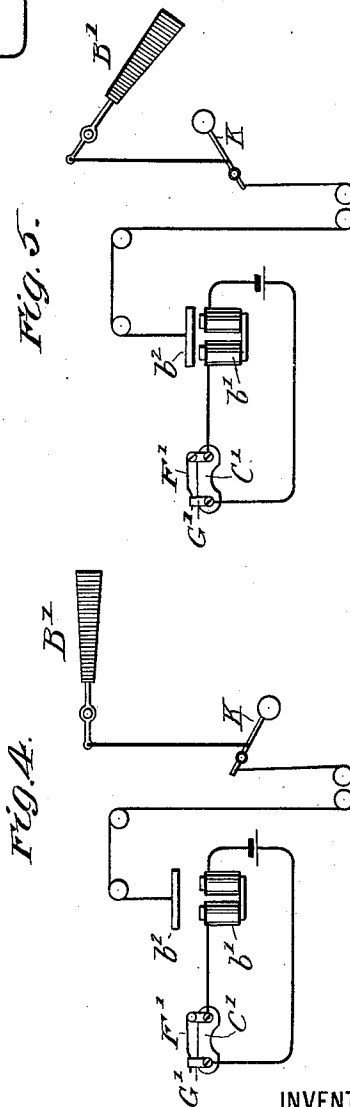
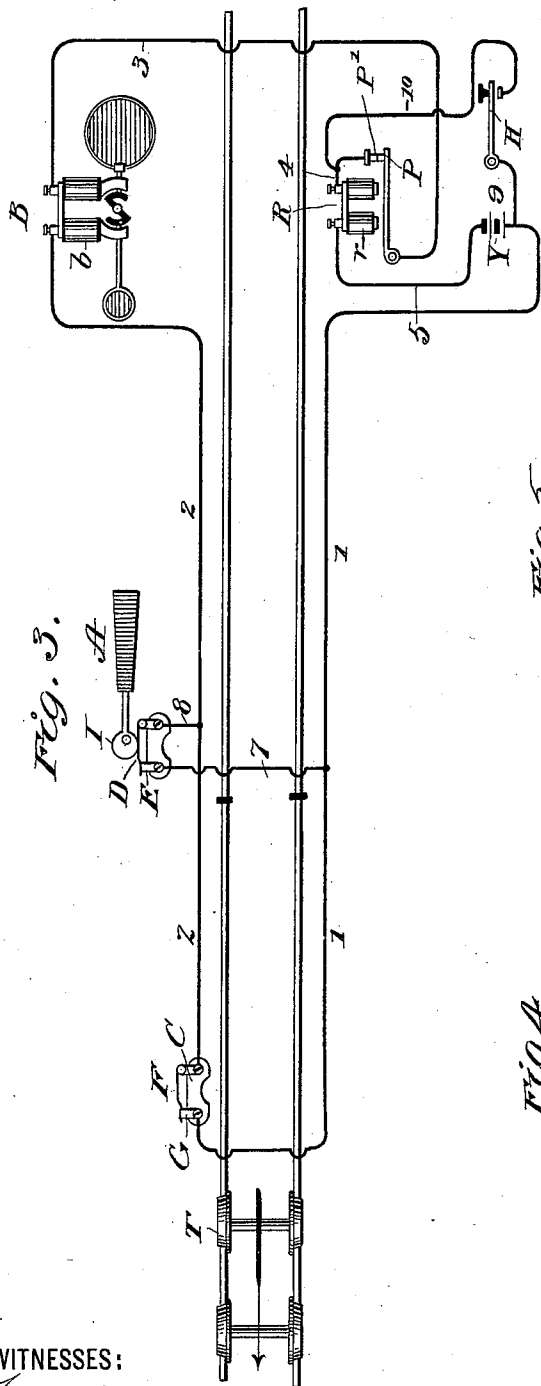
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UNITED STATES PATENT OFFICE.

ALVAH W. HALL, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO ALFRED M. COLLETT, OF SAME PLACE.

RAILWAY BLOCK-SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 545,494, dated September 3, 1895.

Application filed June 15, 1895. Serial No. 552,868. (No model.)

To all whom it may concern:

Be it known that I, ALVAH W. HALL, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Railway Block-Signal System, of which the following is a full, clear, and exact specification.

My invention relates to a new and useful improvement in railway block-signal systems; and it consists in providing a supplemental signal to be used in connection with a block-signal, which shall, in the case of manually-controlled block-signals, automatically set the supplemental signal at "danger" in case the signal-man neglects to put the block-signal at "danger" after a passing train or in case the signal itself fails to respond to the action of the signal-man, and in the case of automatic block-signals shall automatically set the supplemental signal at "danger" whenever the block-signal fails to move from "safety" to "danger" by the action of a passing train.

The object of my invention is to provide a supplemental signal in conjunction with a railway block-signal, which supplemental signal shall automatically indicate the failure of the regular block-signal to respond in either of the cases above described, and shall remain in the failure-indicating or "danger" position until the cause of said failure has been ascertained and corrected. In the case of manually-controlled block-signals, the means of restoring the supplemental signal from "danger" to "safety" will be mechanical and will be under lock and key, over which the signal-man has no control, thus making it necessary for an employé other than the signal-man to mechanically restore the signal to "safety." In the case of automatic block-signals, when the block-signal fails to act, the supplemental signal will be set by the train at the failure-indicating or "danger" position, where it remains until mechanically restored to the "safety" position after the cause of the failure of the block-signal has been noted and corrected.

My invention is illustrated by the accompanying drawings, in which—

Figure 1 is a plan view of a section of track, showing a diagrammatic view of a circuit and the instruments used therewith and employed

in carrying out my invention, said circuit being closed. Fig. 2 is a similar view, said circuit being open. Fig. 3 is a similar view, said circuit being short-circuited. Fig. 4 is a diagrammatic view of a modification of one of the elements of my invention in one position, and Fig. 5 is a view of the same modification in a different position from that illustrated in Fig. 4.

Similar letters and numerals refer to similar parts in all the figures.

Briefly, the method which I employ to carry out my invention is to place a closed-circuit track-instrument of any well-known type at a certain distance within a section controlled by a block-signal, and connected in circuit with a supplemental failure-indicating signal. The circuit when complete, as shown in Fig. 1, holds the supplemental signal at "safety." From this circuit a connection is made with a circuit-closer hereinafter described, which is attached to the block-signal in such a way that said circuit-closer is closed only when said block-signal is at "danger." The closing of this circuit-closer short-circuits the circuit, so that a train in operating the track-instrument does not affect the supplemental signal. It is obvious, therefore, that when the block-signal fails to go to "danger," the circuit-closer being open, there being no short circuit, allows the train when it operates the track-instrument to open the circuit, and the supplemental signal goes to "danger." The supplemental signal may be placed either at the block-signal which it supplements or may precede it at any desired distance, the latter condition being shown in the drawings. The supplemental signal may be either of the semaphore or disk type. In the drawings I assume the block-signal to be manually controlled and the supplemental signal to be of the automatic disk type.

A is a block-signal.

B is a supplemental failure-indicating signal.

b is a magnet automatically controlling signal B.

C is a closed-circuit track-instrument of any well-known form. F is the circuit-breaker of said track-instrument, and G its anvil.

D is a circuit-closer operated by signal A. F is the anvil of said circuit-closer.

I is a cam fixed on the shaft to the signal A, which cam when said signal moves to "danger" operates to close the circuit-closer D.

R is a relay. r is the magnet of said relay, and P P' are the contact-points of said relay.

T is a train, Y a battery, and H a hand-key to restore the supplemental signal, as herein-
after described.

The operation of my invention may be explained as follows: In Fig. 1 the circuit is closed and the signal B is held at "safety," as shown, the circuit being completed from the battery Y, wire 1, anvil G, spring F, wire 2, electromagnet b , wire 3, contact-points P P', wire 4, electromagnet r , wire 5, to battery. In Fig. 2 a train T is shown as being in the block-section, with the block-signal A at "safety" and the supplemental signal B at "danger," and indicating the failure of the block-signal. As previously stated, when the block-signal is in the "safety" position the circuit-closer D is open, so that when the train T reached the track-instrument C it operated it and opened the circuit of supplemental signal B, the first wheel of the train breaking the contact between spring F and anvil G, breaking the circuit and demagnetizing electromagnets b and r , permitting signal B to fall to "danger," and also opening the contact-points P P'. After the train had passed track-instrument C, contact between spring F and anvil G was restored, but as the circuit is now open at P P', as before stated, the signal B will remain at "danger" until the said points P P' are again brought in contact. In Fig. 3 the train T is shown as being in the same position as in Fig. 2, with the block-signal A at "danger" and the supplemental signal B at "safety." The setting of the block-signal A at "danger" closed the circuit-closer D and so short-circuited the circuit of supplemental signal B, the circuit now being completed from battery Y, wire 1, wire 7, anvil E, circuit-closer D, wire 8, wire 2, electromagnet b , wire 3, contact-points P P', wire 4, electromagnet r , wire 5, to battery. When the train operated track-instrument C, as shown in Fig. 3, it had no effect on the supplemental signal, as the circuit was short-circuited through block-signal A.

In the foregoing description, where the disk-signal is used as a supplemental signal, it will be seen that the armature of magnet b is always in the field of its magnet and that it is necessary to interpose relay R for the purpose of keeping the circuit open at P P' after it

shall have been momentarily opened by the train operating track-instrument C, as before described. When a semaphore signal B' is used, as shown in the modification illustrated in Figs. 4 and 5, in place of the disk supplemental signal B, it will be seen that the relay may be dispensed with, the act of the signal B' going to "danger" (see Fig. 4) removing the armature b out of the field of its magnet b , where it remains until the signal B' is restored to "safety." (See Fig. 5.)

The supplemental signal B (shown in Fig. 2) may be restored to "safety" by the hand-key. When said hand-key is closed, a circuit is completed from battery Y, wire 9, key H, wire 10, wire 4, electromagnet r , wire 5, to battery, thus energizing the magnet r , thus closing the points P P', which completes the signal-circuit and restores signal B to "safety."

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a railway signal system, a block signal, a circuit closer in conjunction therewith and operated thereby, an automatic supplemental signal for said block signal, and a normally closed circuit including a track instrument, substantially as described.

2. In a railway signal system, a block signal, a circuit closer in conjunction therewith and operated thereby, an automatic supplemental signal for said block signal, and a normally closed circuit track instrument with a battery and circuit all arranged substantially as and for the purpose specified.

3. In a railway signal system, a block signal, a circuit closer in conjunction therewith said circuit closer being normally open and being adapted to be mechanically closed by said block signal, an automatic supplemental electric signal to operate as a failure indicator, a normally closed circuit track instrument adapted to be mechanically opened by a train, all substantially as and for the purpose specified.

4. In a railway signal system, a block signal, a normally open circuit closer in conjunction therewith and adapted to be closed when said signal is at "danger," a supplemental automatic signal, a normally closed circuit track instrument and a circuit, relay and battery all arranged substantially as and for the purpose specified.

ALVAH W. HALL.

Witnesses:

R. C. MITCHELL,
ALFRED M. COLLETT.