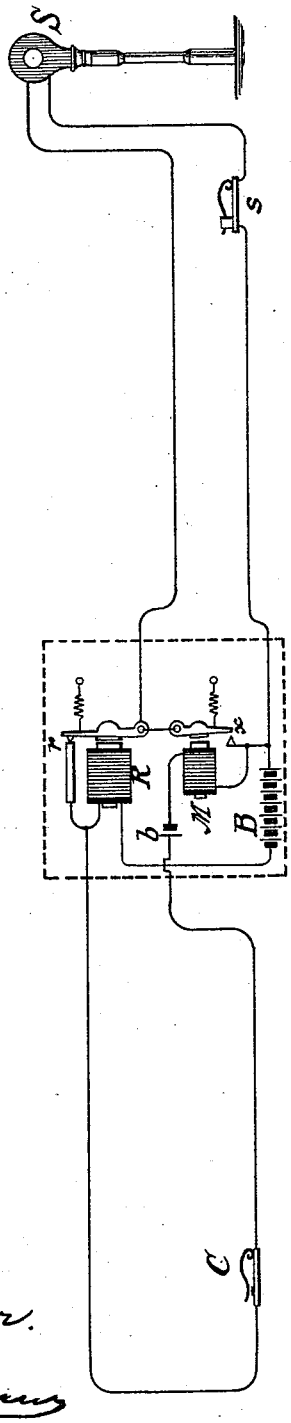
(No Model.)

W. STEVENS & H. J. HOVEY.

ELECTRIC RAILWAY SIGNAL.

No. 455,266. Patented June 30, 1891.



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ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 455,266, dated June 30, 1891.

Application filed November 11, 1890. Serial No. 371,026. (No model.)

To all whom it may concern:

Be it known that we, WINSLOW STEVENS and HENRY J. HOVEY, citizens of the United States, residing in New Haven, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Electric Railway-Signals, of which the following is a specification.

Our invention relates to electric railway-signals, with particular reference to automatic apparatus in which moving trains act upon circuit-controlling devices to alter the position of the signals to block and clear successive sections of the track.

The invention is designed to prevent disaster or irregular operation due to the failure of the apparatus to properly perform its functions.

The invention consists of the following-described apparatus.

In the accompanying drawing, the figure represents a diagram of the circuits controlling one section or block of a track.

The signal is represented by S. It is usually located at the beginning of a section.

s represents a track-instrument consisting of a circuit-breaker operated by the wheels of a train on its entrance to the section. This instrument controls the circuit of battery B, including the signal and a relay R, the armature of which is adapted to make and break this circuit at the points *r*. This circuit is normally closed, and while complete holds the signal disk or blade in the position of "safety;" but as soon as it is opened the signal drops by gravity to "danger." The circuit is, therefore, the "blocking-circuit."

C represents a normally-open circuit-closing track-instrument located at or beyond the end of the section or block and included in a second circuit from battery B, which circuit also includes relay R and magnet M. The function of this circuit is to reset the signal to "safety" as a train is passing out of the section or block, and is commonly known as the "clearing-circuit." The armature of magnet M controls a complete short circuit *x* of the battery B, including the relay R.

b indicates a cell of battery inserted in the clearing-circuit in series with the main battery B. Its function will be set forth in the description of the operation, which will now be given. When S is at "safety," a train enters the block and momentarily breaks the circuit at *s*. This devitalizes the signal-magnet and allows the signal to fall by gravity to "danger." It also devitalizes relay R, which permanently opens the blocking-circuit at *r*. The signal remains at "danger" then until the train reaches the end of the section, and temporarily closes the clearing-circuit at C through R, whereat, *s* being in its normal closed position, the blocking-circuit is completed at *r* and the signal S lifted to "safety." So far described this is the common mode of operation of this class of signals; but it sometimes happens that even after a train has passed out of a section the signal remains at "danger" for an indefinite time and prevents the farther movement of trains. Investigation has shown that there are two causes for this—first, that the clearing-instrument C may stick and hold both the clearing and blocking circuits closed, in which case the battery B, being split, may or may not be strong enough to lift the signal, and, second, the wires of the clearing-circuit may become accidentally crossed and produce the same result. Therefore the magnet M, controlling the short circuit *x*, and the battery *b* are placed in the clearing-circuit. Their operation is as follows: When the clearing-circuit is closed, magnet M and relay R become energized, thus closing both the blocking-circuit and the short circuit *x*. The short circuit, however, is so complete that the blocking-circuit gets no appreciable current at all, the result being that the signal is held positively at "danger" until the clearing-circuit opens, which it normally does when the last wheel of a train passes out of a section. If, however, the apparatus becomes deranged, so as to cause the instrument C to stick, or a cross of the wires of the clearing-circuit takes place, then *x* is held closed positively, and, the danger-signal remaining in sight, an abnormal space of time is indication that the apparatus is out of order. Battery *b* insures that the short circuit *x* will be held closed. If this battery were not utilized, the portion of the current of battery B flowing in the clearing-circuit might not be sufficient to hold the circuit *x*

closed. The armature of magnet M would, therefore, vibrate, and might result in setting the signal to "safety."

Having now described our invention, we claim—

1. In an electric railway system, the combination, with a blocking and a clearing circuit, both emanating from the same battery, of a short circuit for said battery, and a magnet in the clearing-circuit controlling said short circuit, and a second battery in the clearing-circuit, for the purpose set forth.

2. In an electric railway signaling system, the combination, with a blocking and a clearing circuit, a battery and a relay included by both of said circuits, a short circuit for said battery, a magnet in the clearing-circuit controlling said short circuit, and a second battery in the clearing-circuit in series with the first battery, substantially as described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

WINSLOW STEVENS.
HENRY J. HOVEY.

Witnesses:
WM. P. HALL,
DAVID F. TOUMEY.