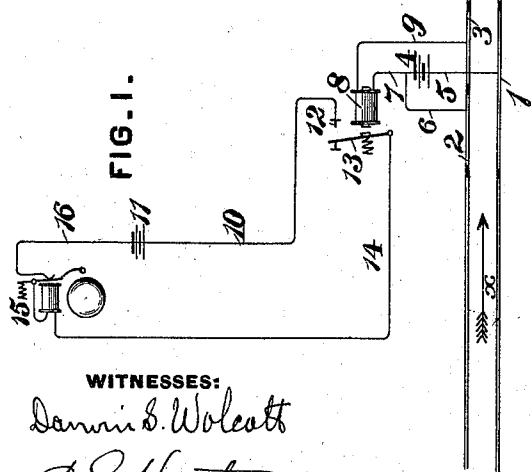
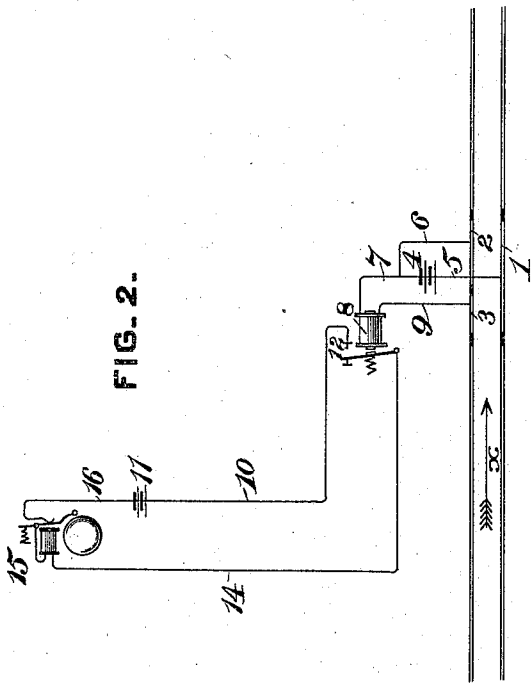


(No Model.)

J. V. YOUNG.
SIGNAL CIRCUIT.

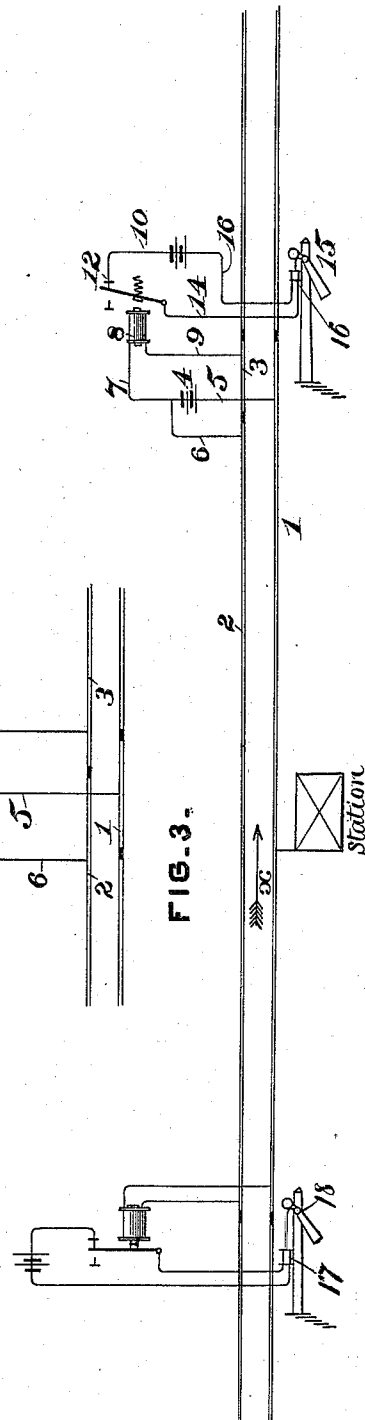
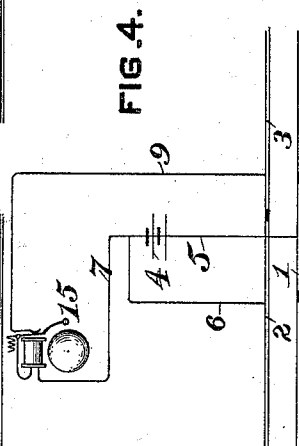
No. 550,670.

Patented Dec. 3, 1895.



WITNESSES:

Dennis S. Wolcott
C. E. Hunt.



INVENTOR,

John V. Young
by George N. Christy
Att'y.

UNITED STATES PATENT OFFICE.

JOHN V. YOUNG, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA.

SIGNAL-CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 550,670, dated December 3, 1895.

Application filed July 8, 1893. Serial No. 479,890. (No model.)

To all whom it may concern:

Be it known that I, JOHN V. YOUNG, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented or discovered certain new and useful Improvements in Signal-Circuits, of which improvements the following is a specification.

The invention described herein relates to certain improvements in electric signaling whereby the presence of the front or rear end of a train at a certain predetermined point or points is indicated. The usual manner of indicating the presence of a train at a certain point is to employ a track-circuit whose relay controls a local circuit for operating the signal. In such an arrangement the local circuit would be either broken or closed, thereby operating the signal during the passage of the entire train over the insulated section forming the track-circuit. This continuous operation of the signal has been overcome by employing two independent adjacent track-circuits having the armatures of their relays included in a local signal-circuit which is so arranged that it is broken or closed to operate the signal only when one of the track-circuits is closed and the other one broken. In such an arrangement the signal is in operation only when the rear or front end of a train is passing over the insulated sections forming the track-circuit.

The object of this invention is to effect the indication of the presence of the front or rear end of a train at a certain predetermined point by the employment of only one track-battery and relay, as hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 represents the arrangement of circuits for indicating the presence of the rear end of a train at a certain point. Fig. 2 represents the arrangement of circuits for indicating the presence of the front end of a train at a certain predetermined point. Fig. 3 represents the arrangement of circuits for operating signals for controlling the movements of trains. Fig. 4 illustrates a modification of the circuits wherein the signal or indicator is included in the track-circuit.

In the practice of my invention a portion of one of the rails is insulated, and the portions 2 and 3 of the other rail are insulated not only from the remaining line of rail but also from each other. It is not necessary that the portions 2 and 3 should be insulated from the line of rail, but should be insulated from each other at a point about midway of the length of the insulated rail-section 1. One pole of the battery 4 is connected by a wire 5 to the section 1 and the other pole to the rail-section 2 by a wire 6 and by the wire 7 to one terminal of the relay 8 while the other terminal of the relay is connected by the wire 9 to the rail-section 3. The local or signal circuit is formed by a wire 10, connecting one pole of the battery 11 with the contact-point 12, the armature 13 of the relay 8, the wire 14, the signaling or indicating mechanism 15, and wire 16, connected to the opposite pole of the battery.

It will be observed that the track-circuit and signal-circuit are normally open. As the train approaching in the direction of the arrow *x* passes onto the rail-sections 1 and 2 they will be electrically connected through the wheels and axles, and the current from the battery will flow through the circuit formed, by wires 5 and 6 and wheels and axles of the train. As the wheels of the train pass onto rail-sections 3 and 1, electrically connecting them, the current from the battery will not be diverted from the circuit first formed, as it presents less resistance than the circuit through the relay 8. Hence the local or signal circuit will not be closed as long as both circuits of the battery 4 are complete, as stated. As soon, however, as the last pair of wheels of the train pass off of rail-section 2, thereby breaking the low-resistance circuit of battery 4, the current from said battery will flow through the circuit of which the relay 8 and the last pair of wheels form a part, thereby exciting the magnet of relay 8, so that the armature 13 will be shifted into contact with the point 12, completing the signal-circuit. This signal-circuit will remain closed, operating the signal or indicator as long as the rail-sections 1 and 3 are electrically connected by the wheels of the car and the rail-sections 1 and 2 are not so connected.

When it is desired to provide for the operation of a signal or indicator by the front end of the train only, the "cut-out" circuit, as the circuit formed by the battery 4, wires 5 and 6, and rail-sections 1 and 2 may be termed, is arranged to be closed after the relay-circuit, consisting of the battery, relay 8, wires 7, 9, and 5, and rail-sections 1 and 3, as shown in Fig. 2. This closing of the shunt or cut-out circuit cuts out the relay-circuit, thereby breaking the signal-circuit, which has been previously closed by the closing of the relay-circuit by the passage of the train onto the rail-sections. Thus it will be seen that the signal or indicator will be operated while the wheels of a train are passing over the rail-sections 1 and 3, but will be stopped as soon as a pair of wheels passes upon the rail-sections 1 and 2, thereby closing the cut-out circuit.

As shown in Fig. 3, the signal-circuit may be a normally-closed circuit and the arrangement of circuits shown employed for operating a signal which will go to "danger" on the breaking of the signal-circuit by the passage of the front or rear wheels of a train over the rail-sections 1, 2, and 3, dependent upon whether the cut-out circuit is arranged to be closed before the relay-circuit, as in Figs. 1 and 3, after the relay-circuit, as in Fig. 2.

As shown in Fig. 4, a signal or indicating mechanism may be substituted for the relay 8 in the "relay-circuit," thereby avoiding a local or independent circuit for operating the signal or indicator.

The arrangement shown in Fig. 3 is designed to be used in connection with signals operated mechanically by levers in a block tower or station, the lever controlling the signal 15 being electrically controlled from the succeeding tower, as in the Sykes and Union block systems. The connection between the signals and their operating-levers is formed in part by "slot" mechanisms 16 and 17, indicated on the posts of signals 15 and 18 in Fig. 3. The rupture of the signal or relay circuits causes the signals to go to "danger" and remain in that position until the rear end of the train passes off the insulated sections 1 or 3. These signals 15 and 18 are located on opposite sides of a station, the signal 18 controlling incoming trains, while the starting-signal 15 controls outbound trains. It will be observed that track-section 1 extends from signal 18 to signal 15. Hence signal 18 cannot be cleared to permit of the entrance of a train

to the station until after the first train has passed off of track-section 1. The signal 15 will remain clear until the last wheels of the first train pass off sections 1 and 2 and onto section 3, whereupon its slot connection will be broken and the signal will go to "danger" and will remain in that position until the operator in the next succeeding tower unlocks its operating-lever in the manner well known in the Union block and Sykes electric block systems. By using the signal 18 a train can be permitted to leave the preceding station without waiting for the first train to pass beyond signal 15, as the signal 18 will protect the rear of the first train while at the station. The system shown in Fig. 3 is designed for double-track roads, where the trains move in one direction on a track.

As soon as a train passes off track-section 1 it is possible for the operator to pick up signal 18 and clear the same, so as to permit a second train to enter the station.

I claim herein as my invention—

1. The combination of an insulated rail section in one line of rails, a battery, a shunt or "cut out" circuit including therein the insulated section of one of the lines of rail and one of the rail sections of the other line of rails, and a "relay" circuit controlling a signal or indicator and including therein the insulated section and the other rail section, the insulated sections in the same line of rails being in such proximity to each other that the circuits including them can be simultaneously closed by the same car or train, substantially as set forth.

2. The combination of an insulated rail section in one line of rails, two rail sections insulated from each other in the other line of rails, a battery, a shunt or "cut out" circuit including therein the insulated section of one of the lines of rail and one of the rail sections of the other line of rails, a "relay" circuit including therein the insulated section and the other rail section, and a signal circuit controlled by the "relay" circuit, the insulated sections in the same line of rails being in such proximity to each other that the circuits including them can be simultaneously closed by the same car or train, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN V. YOUNG.

Witnesses:

CHAS. A. G. WINTHER,
E. H. SPAULDING.