(No Model.) 2 Sheets—Sheet 1.

W. J. SMITH & J. W. FOX.

ELECTRIC RAILWAY SIGNAL.

No. 431,011. Patented June 24, 1890.

Fig. 1.

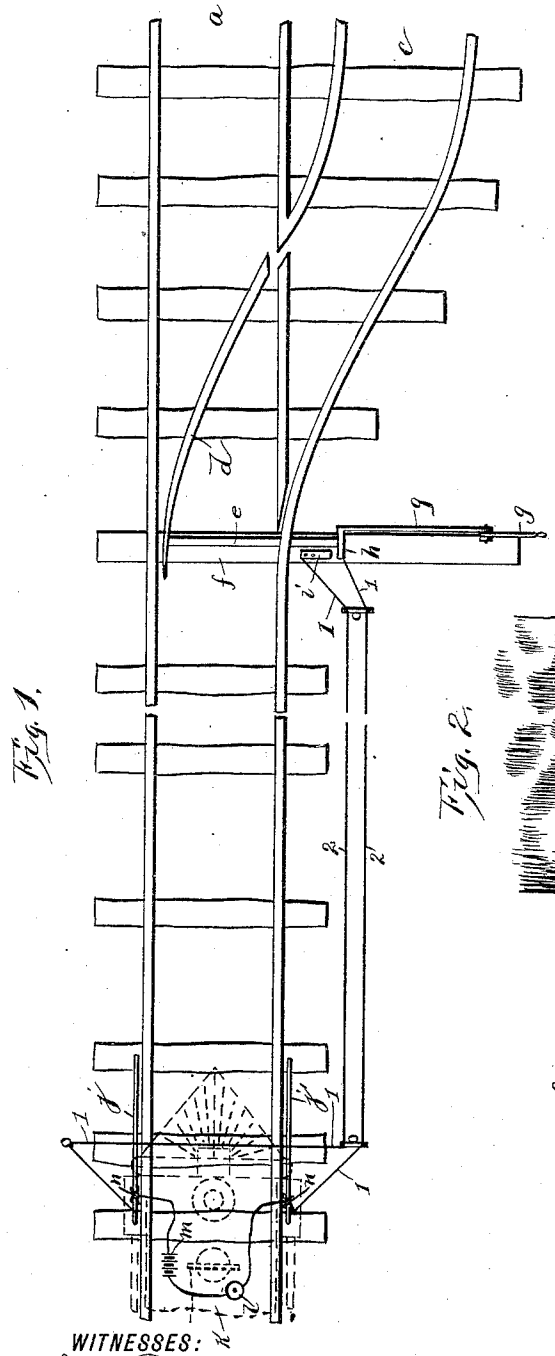
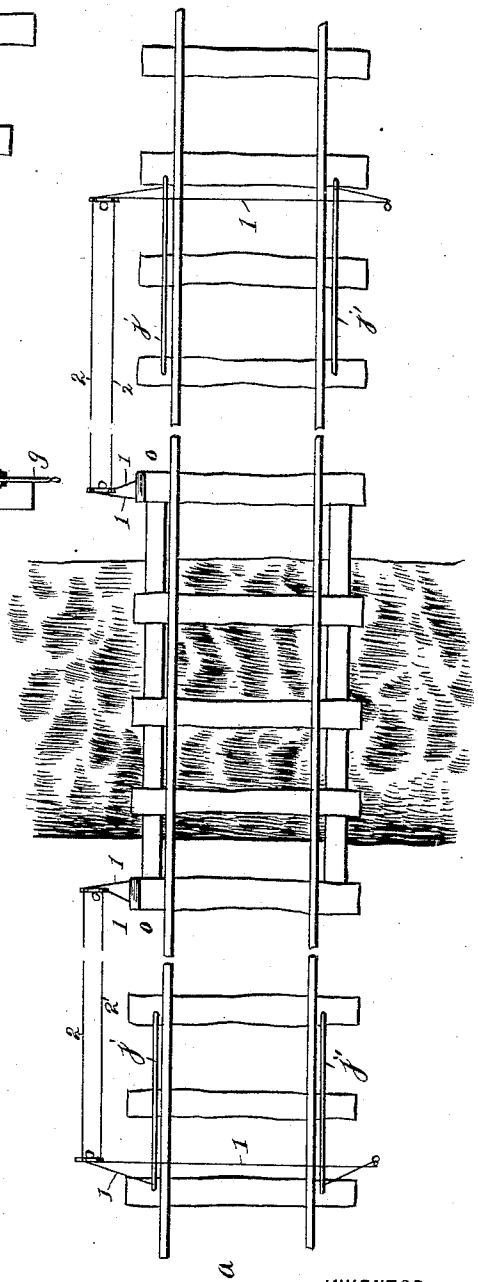


Fig. 2.



WITNESSES:

E. L. Duffy

H. E. Peck

INVENTOR

and Wm. J. Smith

J. W. Fox

BY O. E. Duffy

ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

W. J. SMITH & J. W. FOX.

ELECTRIC RAILWAY SIGNAL.

No. 431,011. Patented June 24, 1890.

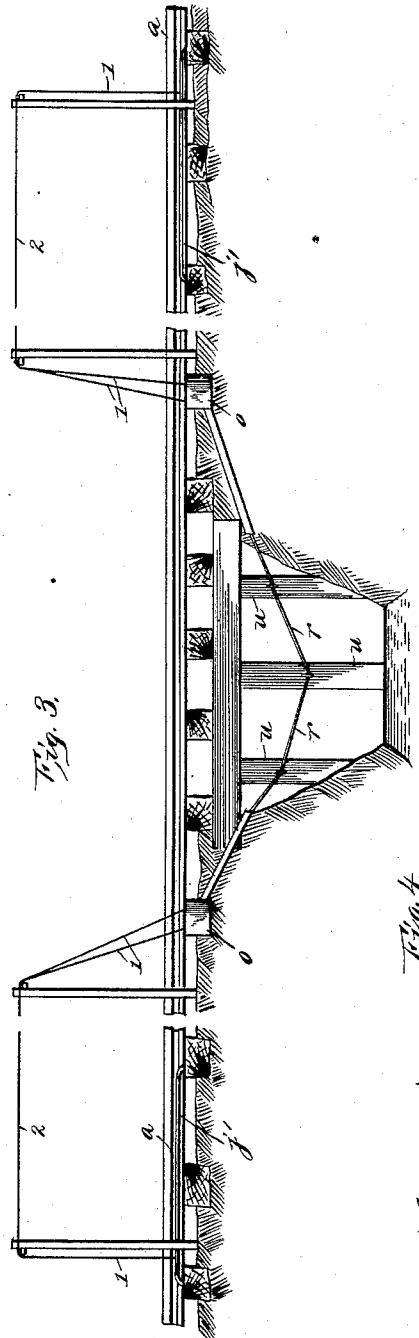


Fig. 3.

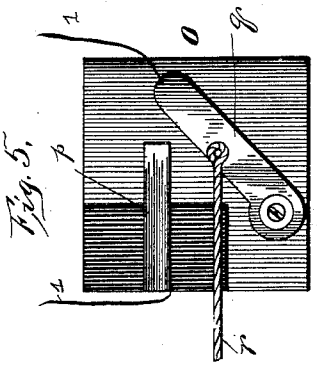


Fig. 5.

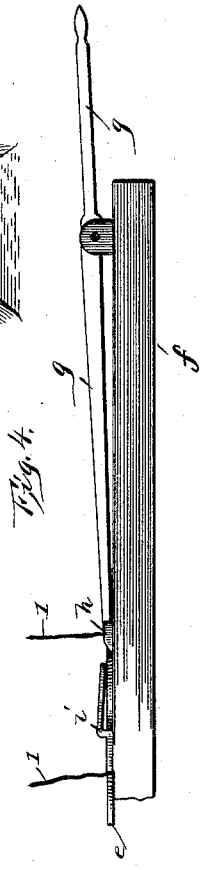


Fig. 4.

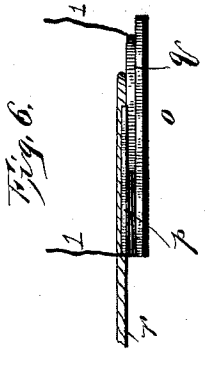


Fig. 6.

WITNESSES:

O. E. Duffy

Chas. M. Merle

INVENTOR

Wm. J. Smith

and J. W. Fox

BY O. E. Duffy

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM JAMES SMITH, OF CHARLOTTESVILLE, AND JAMES WALTER FOX, OF LEXINGTON, VIRGINIA, ASSIGNORS OF TWO-THIRDS TO ASHER AYRES AND GEORGE C. JORDON, BOTH OF STAUNTON, VIRGINIA.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 431,011, dated June 24, 1890.

Application filed January 21, 1890. Serial No. 337,623. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM JAMES SMITH, of Charlottesville, Albemarle County, and JAMES WALTER FOX, of Lexington, in the county of Rockbridge and State of Virginia, have invented certain new and useful Improvements in Electric Railway-Signals; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in electric railway-signals.

The object of the invention is to provide an improved, cheap, simple, and effective arrangement whereby the engineer of an approaching train on the main track will be notified if a switch is open and swung to throw his train from the main track, and, also, whereby the engineer of an approaching train will be notified of danger if a bridge or trestle-work is in dangerous condition. These objects are accomplished by and the invention consists in certain novel features of construction and in combination of parts more fully and particularly pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a plan of a section of railroad provided with the present invention and showing a switch and a locomotive (in diagram) on the track. Fig. 2 is a plan of a track and trestle-work provided with this invention. Fig. 3 is a side elevation of the trestle and portion of track on both sides thereof. Fig. 4 is a detail of the circuit maker and breaker operated when the switch is changed. Figs. 5 and 6 are details of the circuit-closers at the bridge.

In the drawings, the reference-letter *a* indicates a railroad track.

c is a side track, and *d* the switch between the main and side tracks. The switch-rails are secured to move with the horizontal sliding switch bar or rod *e*, sliding on the base-tie *f*, as shown, and extending laterally beyond the track. This switch-bar is provided with the lever and link *g* for actuating it to operate the switch. The outer end of the switch-bar outside of the track is provided with the lateral contact-arm *h*, rigidly secured to and preferably insulated from the switch-bar.

When the switch is closed to throw the main track into continuity with the side track, this contact-arm, which is slightly beveled on its engaging face, tightly engages and slides under a stationary spring-contact plate *i*, rigidly secured to the base-tie. This contact consists of a spring-plate secured to the tie at one end and bent up so that its remaining horizontal spring portion will lie a distance above the tie to allow the arm *h* to slide under and tightly engage the same and form a perfect contact. This contact-plate is so formed that the arm *h* will wedge against the same when it is pushed thereunder. When the switch is open and the side track out of continuity with the main track, the contacts *h* and *i* are disengaged.

A suitable distance up the track from the switch—say half or quarter of a mile—a pair of raised conducting-bars *j j'* are located parallel with and on opposite sides of the track. These bars preferably consist of lengths of gas-pipe having their ends bent down and suitably secured to and insulated from the ties or other supports, so that the bars or conductors lie horizontal and will be raised up into planes above the ties or other supports, as clearly shown. The contacts *h i* of the switch-circuit closers are separately and respectively connected by wires 1 with the two separate line-conductors 2 2, supported by telegraph-poles or other means along the track to the two raised conducting-bars *j j'*, to which they are respectively electrically connected, as shown, so that each bar *j* or *j'* will be directly connected with a contact *h* or *i;* hence when said two contacts are in engagement the two raised bars *j j'* will form the terminals of the circuit.

Each locomotive *k* (see dotted lines, Fig. 1) is provided with an electric circuit including an electric alarm *l*, located in the engineer's cab, and a battery or source of electricity *m*. The locomotive is provided with a pair of brushes *n n*, located on opposite sides thereof and forming the terminals of the circuit in the engine. These brushes are so located as to engage the raised conducting-bars *j j'*, and each brush preferably consists of a series of bunches of wires placed one behind the other. From the foregoing it will be evident that if a train approaches the switch when thrown so as not to interfere with the main track there will be no signal given on the train; but if the switch is thrown to place the main and side tracks in contiguity the switch-circuit closer will close the track-circuit between the conducting-bars *j j'*, and when the locomotive brushes engage said bars the circuit will be closed through the locomotive, and the bell therein will be sounded and the engineer thus notified of danger or that the switch is thrown. The conducting-bars *j j'* should be of sufficient length so that the bell will ring a suitable length of time to notify the engineer. If desired, the batteries can be suspended beneath the tender and the brushes extended out from the opposite sides of the tender.

In Fig. 2 an arrangement of the same principle as the foregoing is shown, whereby the engineer of an approaching train is notified if a bridge or trestle-work is in a dangerous condition. The track a suitable distance from and on each side of the bridge or trestle is provided with the conducting-bars *j j'*, arranged just as before described. At opposite ends of the bridge and secured to suitable bases or ties are inclosed boxes *o o*, containing circuit-closers. Each circuit-closer consists of a stationary contact *p*, constructed of a spring-plate rigidly secured to and insulated from a base-plate. This contact is similar to spring-contact *i*, before described. These contacts *p p* of the two bridge circuit-closers are electrically connected by suitable wires, as shown, with one of their line-conductors. The other movable contacts *q q* of the bridge circuit-closers are both electrically connected with the other of their respective line-conductors by suitable wires. Each pair of conducting-bars *j j'* is connected with the bridge circuit-closer on that side of the bridge by a separate pair of line-conductors, so that the circuit-closer and bars *j j'* on opposite sides of the bridge are totally separate. Each contact *q* is pivoted at one end to and insulated from said base-plate, so that its free end can swing beneath or from the spring-contact. This free end is so arranged that the stationary contact extends toward the same and is located in the box on the side toward the bridge, or so that pulling force on the swinging contact from the bridge will swing the free end of said contact beneath the spring-contact. A flexible connection *r* at its end is secured to the free end of the bridge circuit-closers on opposite sides of the bridge. This cable, cord, or connection *r* is loosely secured to each timber, beam, or support *u* of the trestle-work or bridge by staples or other means, so that if the bridge or trestle-work is destroyed, sinks, or if any timber thereof becomes loose and drops the connection will be drawn taut, and thereby draw the two movable contacts into engagement with the stationary contacts, and hence electrically unite the two line-conductors; hence if the train approaches the bridge in either direction the engineer's bell will ring as soon as the brushes of his locomotive reach the raised conducting-bars.

The switch circuit-closers are intended to be inclosed in boxes, and the wires from the switch and bridge circuit-closer boxes are inclosed in pipe or other suitable means of protection.

The extreme simplicity and durability of this system is obvious, also the great want that it fills and the danger of loss of life and property which it obviates.

What we claim is—

1. The combination of two pairs of conducting-bars located along the track a distance from and on opposite sides of a bridge or trestle-work, one or more circuits of which said bars are the terminals, circuit-closers in the same, and means to operate said circuit-closers to electrically unite said bars, for the purpose set forth, when the bridge or trestle-work is destroyed or injured, substantially as described.

2. In an electric railway-signal, the combination of the switch rail or rails, the horizontal sliding switch-bar carrying the same and provided with an operating-lever, the lateral contact-arm rigidly secured to and insulated from said bar and beveled on one longitudinal edge, the spring-contact at one end, secured upon and insulated from the switch-base, having its opposite spring portion raised, so that said arm can slide from or beneath said spring end, and the separate slightly-raised horizontal conducting-bars along opposite sides of the track, separately connected with said stationary and movable contacts, substantially as described.

3. In an electric railway-signal, the combination, with a trestle-work or bridge, of a conducting-bar along the track a distance from the bridge, a normally-open circuit-closer at the bridge, arranged to be closed by the destruction or falling of the bridge, a normally-open line-circuit, including said closer and bar, and a vehicle having an alarm-circuit to close said line-circuit when the circuit-closer is closed, substantially as described.

4. In an electric railway-signal, the combination of the two normally-open circuit-closers respectively located at opposite ends of a

bridge or trestle-work, and each consisting of a stationary contact and a movable contact, means connecting the movable contacts of the two closers and extending along the bridge, so that when tension is exerted on said means both of said closers will be closed, and the two separate line-circuits in which said closers are respectively and directly included, substantially as described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

WM. JAMES SMITH.
JAMES WALTER FOX.

Witnesses as to Smith:
D. W. BURNLEY,
W. L. FRETWELL.

Witnesses as to J. W. Fox:
W. C. GORDON,
WM. I. BREEDLOVE.