

No. 822,626.

PATENTED JUNE 5, 1906.

E. L. NOLTING.  
RAILWAY SIGNAL APPARATUS.  
APPLICATION FILED FEB. 18, 1906.

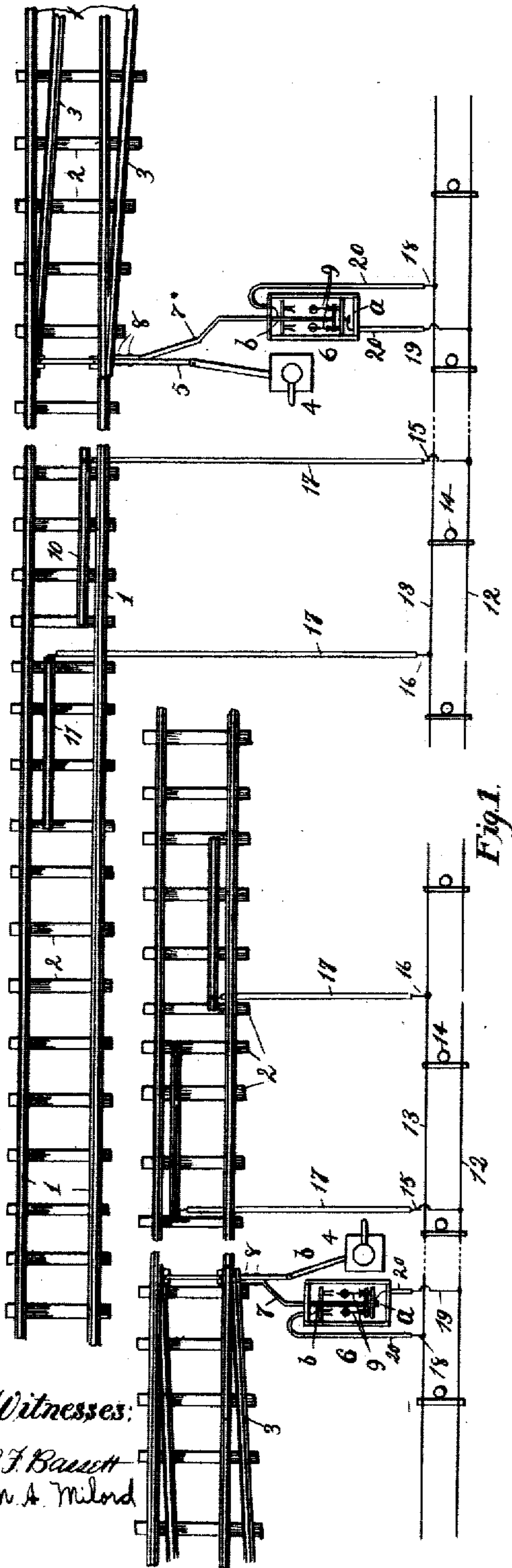


Fig. 1.

Witnesses:  
C. F. Bassett  
M. A. Milord

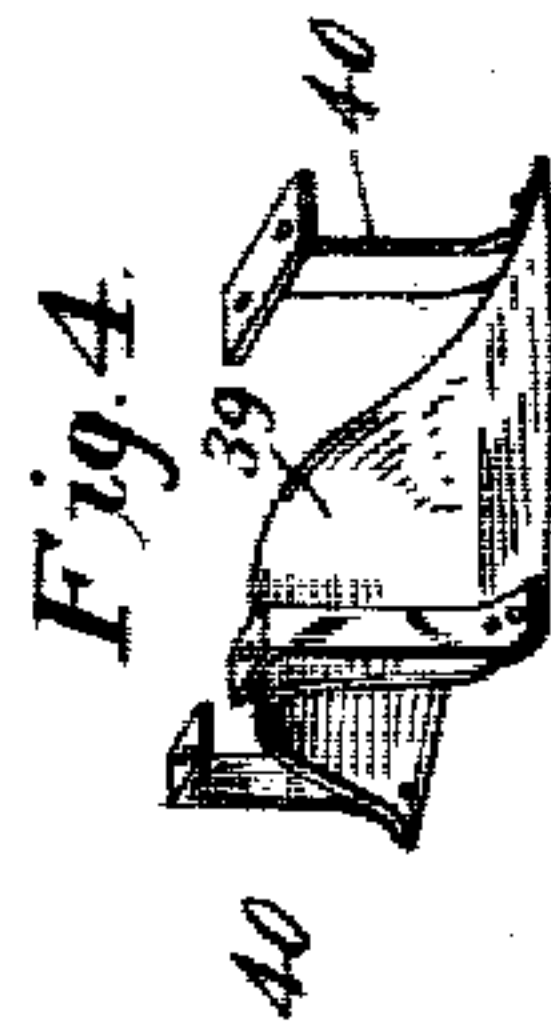


Fig. 4.

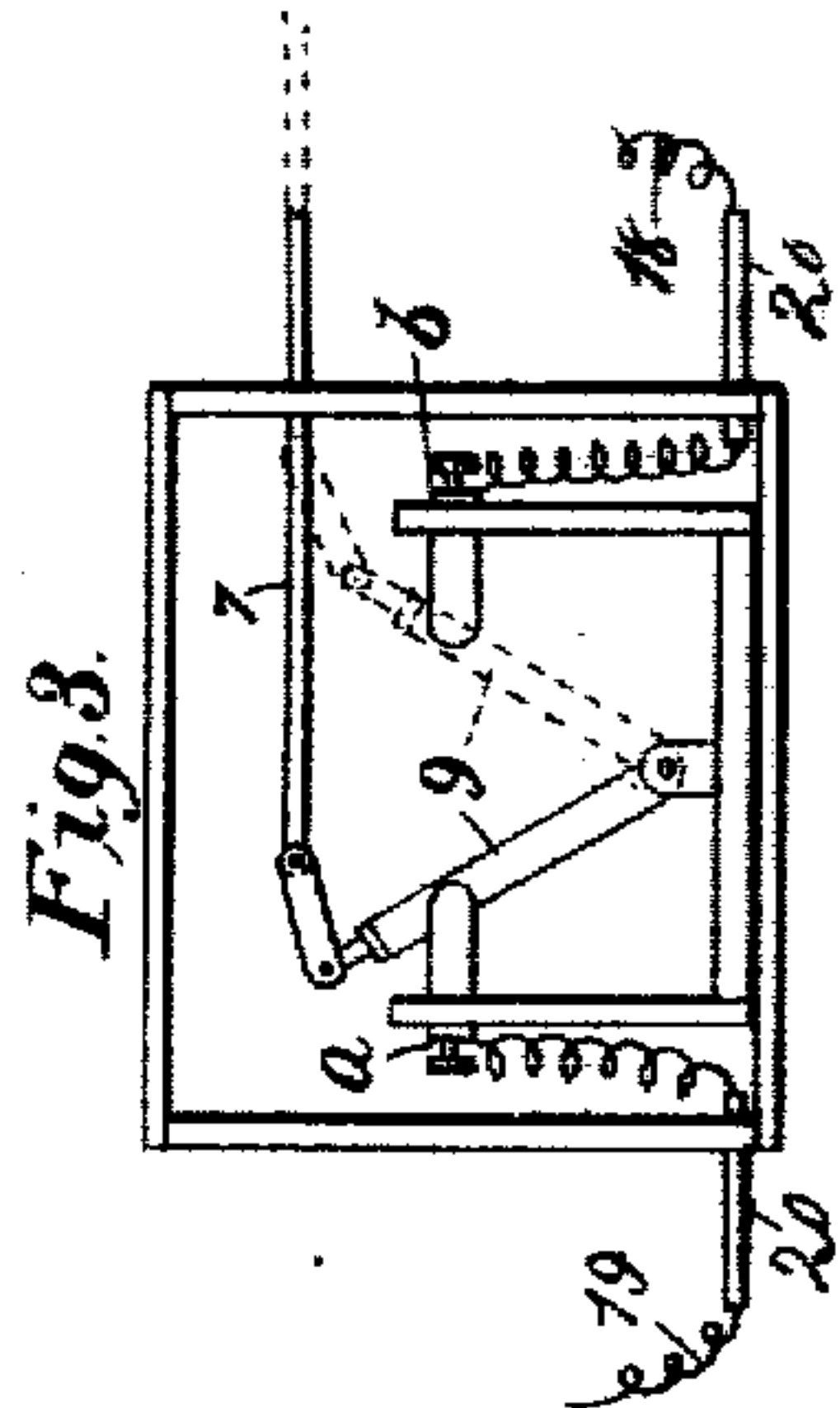


Fig. 3.

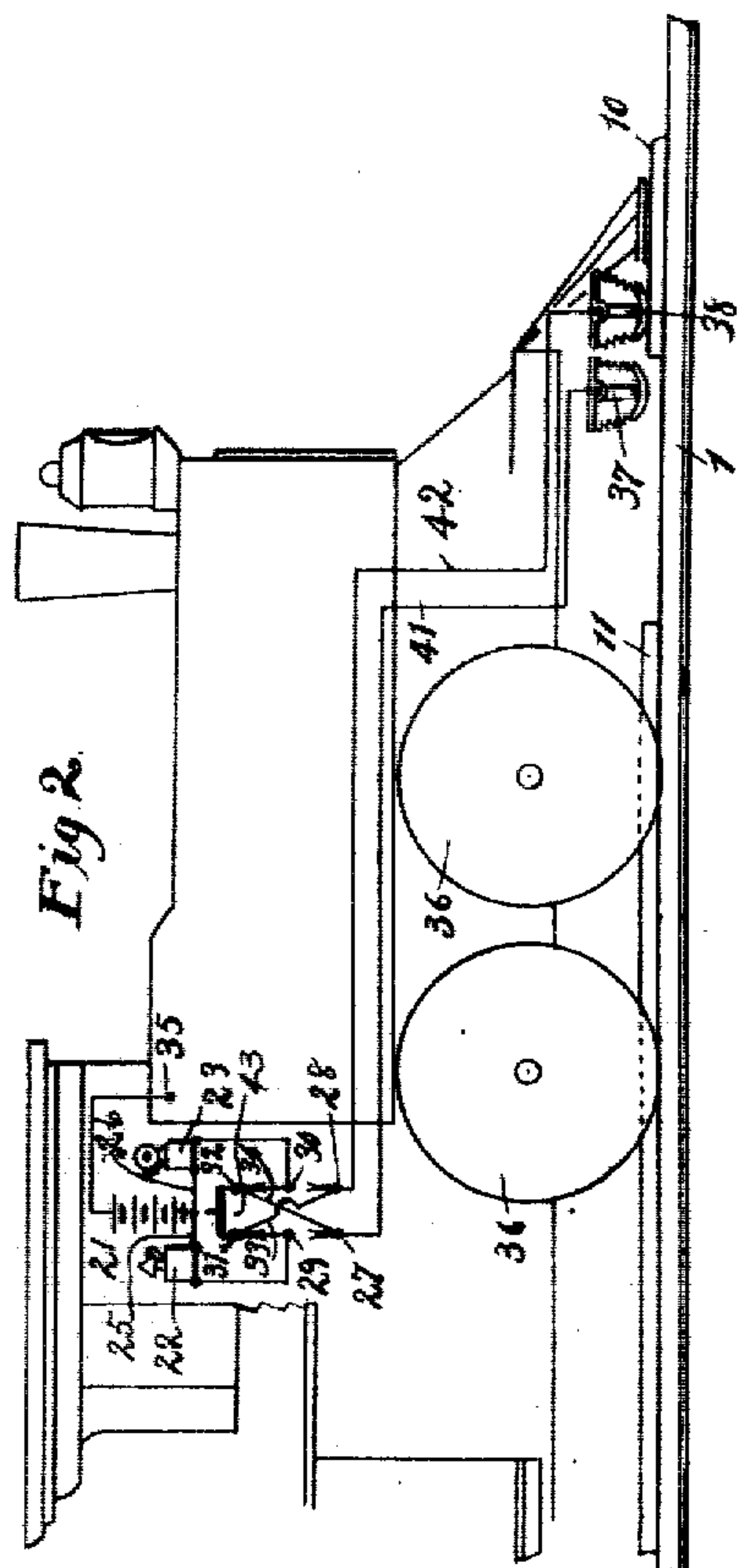


Fig. 2.

Inventor  
Emil L. Nolting  
By Frederick Benjamin  
Att'y



# UNITED STATES PATENT OFFICE.

EMIL L. NOLTING, OF ELGIN, ILLINOIS.

## RAILWAY SIGNAL APPARATUS.

No. 822,623.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed February 16, 1906. Serial No. 301,366.

*To all whom it may concern:*

Be it known that I, EMIL L. NOLTING, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Railway Signal Apparatus, of which the following is a specification.

My invention relates to railway signal apparatus, and is applicable to both single and double track systems wherever side tracks or branches are used in connection therewith.

The objects of my invention are to enable the engineer of a locomotive or motor-car to determine the position of each switch as he approaches it and while still at a sufficient distance therefrom to afford ample time in which to stop his train should such necessity arise and to give positive evidence of the fact should the apparatus be out of order from any cause and fail to work.

In ordinary switch signal devices provision is made for causing an audible signal to be sounded when the switch which is being approached is open. If a bell is used for a signal, the ringing of that bell is evidence of danger. If the bell does not ring, that fact is taken as evidence that the switch is closed and that the train can proceed in safety. This is the system I employ in my improved railway signal apparatus an application for Letters Patent for which was filed in the United States Patent Office, September 18, 1905, Serial No. 278,831. The element of uncertainty, however, enters largely into all appliances, depending upon the conduction of electric currents; and my object in the improvement herein set forth is to eliminate that factor by producing an arrangement that will at all times and under all circumstances and conditions of weather or mechanism notify the engineer by signal or a lack of the same the precise condition of the switch which he is approaching or of the apparatus upon which he is depending for that signal. Thus I provide for a signal when the switch is open and also for a signal differentiated therefrom either in tone or in some other manner that will sufficiently indicate its meaning when the switch is closed. It will at once be obvious that when no signal is given on approaching a switch the engineer will at once perceive that some portion of the apparatus is out of order and will be warned to take proper precautions.

I accomplish the above-mentioned and other objects by the use of an electric switch

mechanically connected to the track-switch and electrically connected to the track-rails and to electric conductors paralleling the track-rails, a duplex magneto-electric signal apparatus and battery carried upon the engine or motor-car and having electric connection with the track-wheels, and means for making electric connection between the signal apparatus and the paralleling conductors.

In the accompanying drawings, which form a part of this specification, Figure 1 is a plan view, partly diagrammatic, of a double-track system equipped with my improved duplex signaling apparatus. Fig. 2 is a side elevation, partly diagrammatic, of a locomotive and cab furnished with my signaling device. Fig. 3 is a side elevation of a double-throw knife-switch, showing the method of making electric and mechanical connection therewith, one side of the casing being removed to disclose the mechanism. Fig. 4 is a view in perspective of the housing which protects the rockable yielding contact-shoe.

Referring to the drawings, 1 represents the main rails of a railway-track, 2 the ties, and 3 the switch-rails, to which a track-switch 4 is attached by a bar 5. A double-pole double-throw electric switch 6 is provided with a rod 7, which is secured to the switch-bar by means of bolts 8. It will be seen that by this arrangement any reciprocating movement of the said bar 5 will be communicated to the pole-changing levers 9 of the switch 6, so that when the track-switch 4 is closed, as indicated in Fig. 1, the electric switch will be in contact at one pole *a* and when the mechanical switch is open the electric switch will be in contact at the other pole *b*, as shown in dotted lines in Fig. 3. Between the track-rails and in the vicinity of each track-switch and its adjacent electric switch are located two sections of electric conductors 10 11, parallel with the track-rails and preferably constructed in the form known as a "third rail," secured to the ties in the usual manner. These third rails are located at equal distances from the median line of the track in order that the contact-shoes hereinafter described may contact therewith whichever may be the direction of travel, since it may sometimes be desirable to make use of the same conductors for two distinct switches when the latter are within a moderate distance of each other. I prefer also to place the said third rails at some distance apart lengthwise of the track in order that it may



not be possible for contact to be made with both sections of rails at the same time. To make electric connection between the said third rails and the opposite poles of the electric switch 6, wires 12 13 are strung in the usual manner upon poles 14, placed beside the track, and are connected to the third rails by wires 15 16, which run underground, where they are protected by insulating-conduits 17. The poles of the electric switch 6 are connected in the same manner to the conductors 12 13 by wires 18 19, also carried underground, where they are provided with insulation 20.

15 An electric battery, which is a necessary adjunct for the device, may be installed at any convenient point adjacent to one of the track-switches, where it can be connected with the line-wire. On the score of economy, however, and for other cogent reasons I prefer to place the battery 21 upon the motor. Thus a single battery will suffice for an indefinite number of switch connections. The signal device consists of two distinct sounders 22 23, varying in tone in order that the ear may readily differentiate the signals. The said sounders are connected to the battery by wires 25 26.

When this signal apparatus is used on a single-track system, a duplex pole-changer having a sextuple set of contact-points 27, 28, 29, 30, 31, and 32 is placed in some convenient location within the engine-cab, the points of one pole 27 28 being connected with the contact-shoes hereinafter described and the axle-points 29 30 with the sounders 22 23, respectively, while the points of the other pole 31 32 are in electric connection with the points 27 28 by the crossed wires 33 34. The object of this switch is to enable the operator to change the relations of the differentiated signals when the direction of the motor travel is reversed. Were this arrangement not in use, the signal for a closed switch on the up-run would be the same as the open signal when the engine was traveling in the opposite direction, and it is to avoid the confusion which would result that this device is placed in circuit. The battery 21 has a direct electric connection with some portion of the metal-work of the engine, as indicated at 35, which forms a connection through the framework with the track-wheels 36, thus insuring electric contact between the battery 21 and the track-rails 1. In order to complete the circuit, contact-shoes 37 38 are provided at any convenient location, which are adapted to engage the sectional rails 10 and 11. While any convenient form of contact-shoe may be used, I prefer to employ a convex rockably and yielding mounted shoe fully described and claimed in my application above cited. In order to protect said contact-shoes from the elements, I provide for each shoe a suitable housing 39, having

brackets 40, by which it can be readily attached to the locomotive or motor-car. The said contact-shoes 37 38 are electrically connected by wires 41 42 with the points 27 28.

In Fig. 1, which represents the track-switches closed, it will be seen that the switch-lever 9 is in contact with the pole *a*. When the shoe 38 is in contact with the rail 10, which it is adapted to engage, as aforesaid, the current will pass through the conductor 42 to the binding-post 28, thence through the wire 33 to the point 31. The contact-lever 43 is shown in contact with points 31 32, but is so insulated that no current can pass from one of the said points 31 32 to the other; but as there is a connection with the point 29 the current will pass there-through to the sounder 22 and thence to the battery. To complete the full description of the circuit, we follow the connection from the battery to the metal contact 35, thence through the metal parts of the locomotive and wheels 36 to the track-rails 1, then by way of the bar 7 to the electric switch 6, and through the conductor 19 to the line-wire 12, which is in electric connection with the third rail 10 by means of the conductor 15, thus completing the electric circuit. Let us suppose, on the other hand, that the switch 4 is open on the approach of the train. In that case the lever 9 will make contact with the pole *b* of the electric switch 6 and the circuit will be complete from the battery 21 through the framework of the engine and track-wheels to the track-rails, the bar 7, the conductor 18, the line-wire 13, the conductor 16, the third rail 11, the contact-shoe 37, the conductor 41, and the wire 34 to the sounder 32, and thence to the battery again. When the switch 4 is closed, the shoe 37 will contact with the rail 11, but no signal will be given, although the apparatus and connections remain unchanged upon the motor-vehicle. The connection, however, will be incomplete at the electric switch 6, since the connections between the said rail 11 and the switch terminate at the pole *b*, while the connections between the companion rail 10 terminate at the pole *a*, and there can be no electric connection between the two third rails.

It is obvious that many changes may be made in the form and construction of my invention hereinbefore described without departing from the spirit or scope thereof, and I therefore do not wish to be limited to the precise details of mechanical structure set forth; but,

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

1. An apparatus for the purpose specified including the track-rails of a railway, a track-switch therefor, a plurality of electric conductors paralleling said track-rails, an electric switch mechanically connected with the



track-switch, a plurality of line-wires each having a separate electric connection with the electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a signal apparatus carried upon said motor-vehicle, an electric battery, electric connections for said battery, and means for making electric connection between the signal apparatus and the said electric conductors.

2. An apparatus for the purpose specified including the track-rails of a railway, a track-switch therefor, a plurality of electric conductors parallel to said track-rails, a double-pole electric switch mechanically connected with the track-switch, a plurality of line-wires each having a separate electric connection with the electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a signal apparatus and an electric battery carried upon said motor-vehicle, electric connections for said battery, and means for making electric connection between the signal apparatus and the said electric conductors.

3. An apparatus for the purpose specified, including the track-rails of a double-track railway system, a track-switch therefor, a plurality of electric conductors paralleling said track-rails, an electric switch mechanically connected with the track-switch, a plurality of line-wires each having a distinct electric connection with the electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a signal apparatus carried upon said motor-vehicle, an electric battery, electric connections for said battery, and means for making electric connection between the signal apparatus and the said electric conductors.

4. An apparatus for the purpose specified including the track-rails of a railway, a track-switch therefor, a plurality of electric conductors parallel to said track-rails, a double-pole electric switch mechanically connected to the track-switch, a plurality of line-wires each having a distinct electric connection with the electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a duplex signal apparatus carried upon said motor-vehicle, an electric battery carried upon said vehicle, electric connections for said battery, and means for making electric connection between the signal apparatus and the said electric conductors.

5. An apparatus for the purpose specified including the track-rails of a double-track system, a plurality of track-switches therefor, a plurality of electric conductors parallel with said track-rails, a double-pole electric switch mechanically connected with the track-switch, a plurality of line-wires each having a distinct electric connection with the

electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a duplex signal apparatus carried upon said motor-vehicle, an electric battery carried upon said vehicle, electric connection between the battery and the signal apparatus and between the battery and the track-rails and means for making electric connection between the signal apparatus and the said electric conductors.

6. An apparatus for the purpose specified including the track-rails of a double-track system, a track-switch therefor, a plurality of electric conductors parallel with the track-rails, a double-pole electric switch mechanically connected with the track-switch, a plurality of line-wires each having a separate electric connection with the electric switch and the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a duplex signal apparatus carried upon said vehicle, an electric battery carried upon said motor-vehicle, electric connection between the battery and the signal apparatus and between the battery and the track-rails and a plurality of contact-shoes carried by said motor-vehicle and adapted to engage the said parallel conductors and electric connection between said contact-shoes and said signal apparatus.

7. An apparatus for the purpose specified including the track-rails of a railway, a plurality of track-switches therefor, a plurality of electric conductors parallel with the track-rails, a plurality of double-throw double-pole electric switches each mechanically connected with a track-switch and electrically connected with the rails of the main track and with the said electric conductors, a plurality of line-wires each having a separate electric connection with the said electric switch and the said electric conductors, a motor-vehicle adapted to travel on said track-rails, a duplex magneto-electric signal apparatus and an electric battery carried upon said motor-vehicle, electric connection between the battery and the signal apparatus and between the battery and the track-rails, a plurality of contact-shoes carried by said motor-vehicle, each adapted to engage one of the said electric conductors and electric connection between said contact-shoes and said signal apparatus.

8. An apparatus for the purpose specified including the track-rails of a railway, a track-switch therefor, a plurality of electrical conductors placed parallel with the track-rails, a double-pole double-throw electric switch mechanically connected with the rails of the main track and with the said electric conductors, a motor-vehicle adapted to travel on the said track-rails, a duplex signal apparatus carried upon said vehicle, an electric battery carried upon the motor-vehicle, an electric pole-changer connected to said battery, electric connection between the battery and



the signal apparatus and between the battery and the track-rails and a plurality of rockable yielding contact-shoes carried by said motor-vehicle and adapted to engage the said parallel conductors separately, a protective housing for each of said shoes, and electric connection between said contact-shoes and said pole-changer, and between the pole-changer and the battery.

9. An apparatus for the purpose specified including track-rails of a railway, a plurality of track-switches therefor, a plurality of double-throw double-pole electric switches each mechanically connected with one of said track-switches, a motor-vehicle adapted to travel on said rails and carrying a magneto-electric apparatus, a battery and a pole-changer, and means for producing differentiated audible signals when the said motor-vehicle is approaching one of the said track-switches.

10. An apparatus for the purpose specified including the track-rails of a double-track railway system, a plurality of track-switches therefor, a plurality of sectional electric conductors paralleling said track-rails and adjacent said track-switches, a plurality of electric switches each mechanically connected

with one of the track-switches, a plurality of line-wires placed adjacent to each electric switch one of said line-wires being in electric connection with one pole of the said electric switch and also with one of the said sectional conductors and the other of said line-wires being in electric connection with the other pole of the electric switch and also with the other of said sectional conductors, a motor-vehicle adapted to travel on said track-rails, a duplex signal apparatus carried upon said motor-vehicle, an electric battery therefor carried on said vehicle, electric connection between the battery and the signal apparatus and between the battery and the track-rails and a plurality of rockable yielding contact-shoes attached to said vehicle each contact-shoe having a protective housing adapted to engage its respective conductor, and electric connection between said contact-shoes and said signal apparatus.

In testimony whereof I affix my signature in presence of two witnesses.

EMIL L. NOLTING.

Witnesses:

WM. QUADE,

WM. J. H. J. ABELMANN.