No. 822,625. PATENTED JUNE 5, 1906.

E. L. NOLTING.

RAILWAY SIGNAL APPARATUS.

APPLICATION FILED SEPT. 18, 1905.

2 SHEETS—SHEET 1.

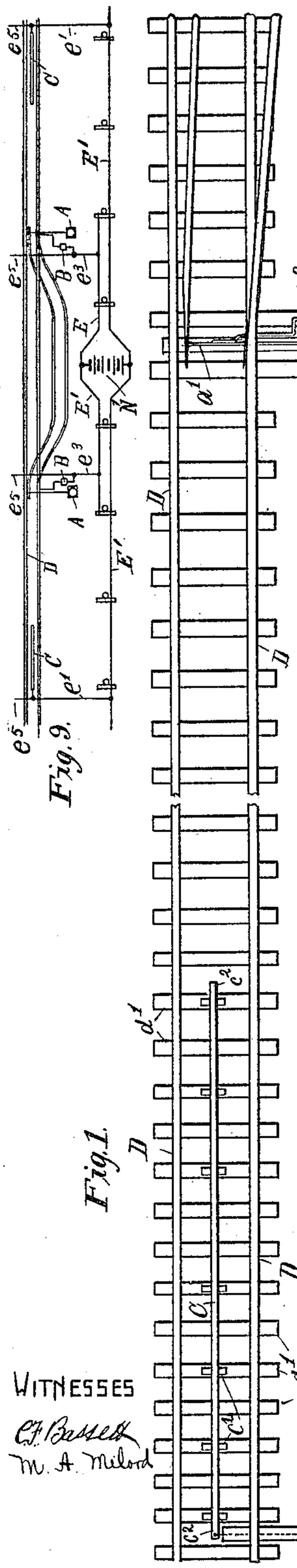

Fig. 9.

Fig. 1.

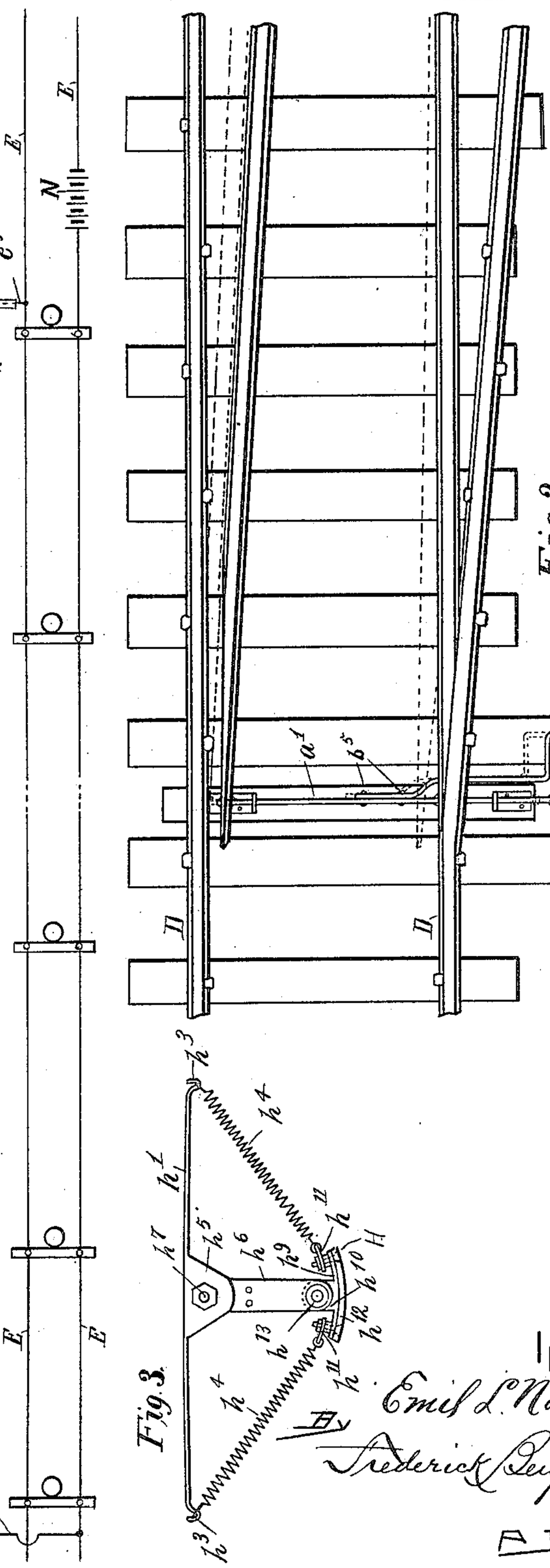

Fig. 2.

Fig. 3.

WITNESSES

C. F. Bassett

M. A. Milord

INVENTOR

Emil L. Nolting

By Frederick Benjamin

ATT'Y

No. 822,625. PATENTED JUNE 5, 1906

E. L. NOLTING.

RAILWAY SIGNAL APPARATUS.

APPLICATION FILED SEPT. 18, 1905.

2 SHEETS—SHEET 2.

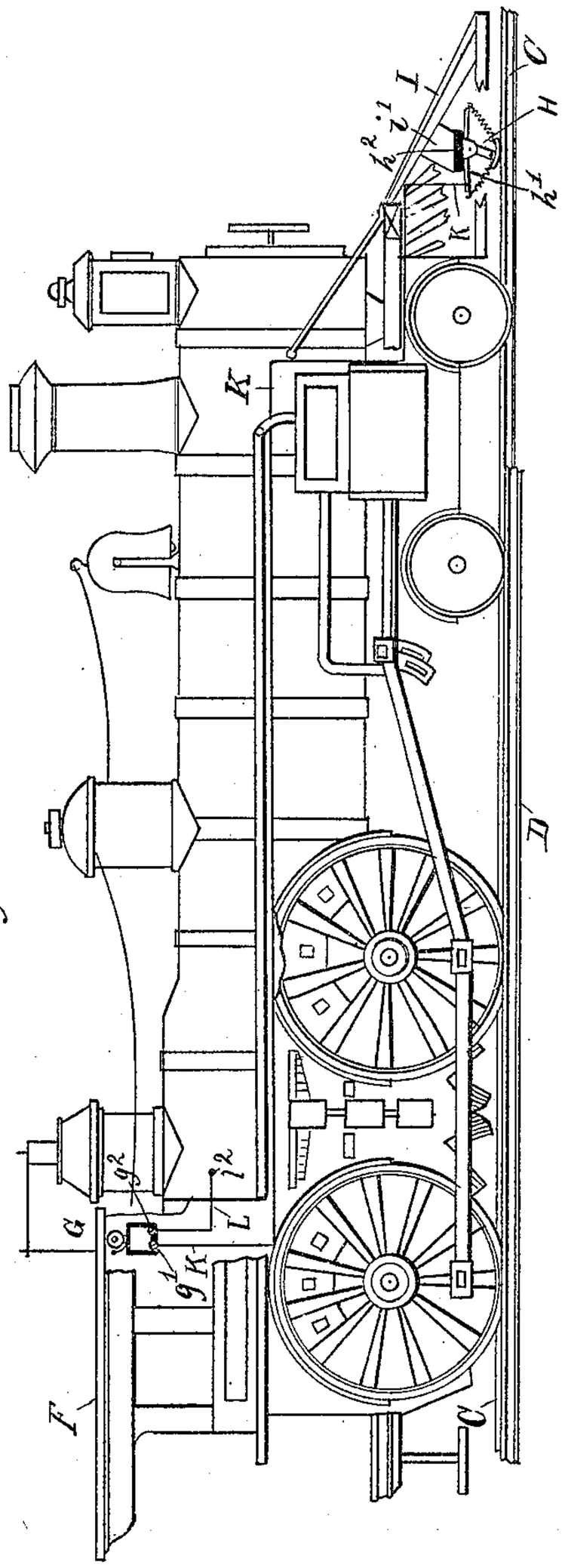

Fig. 4.

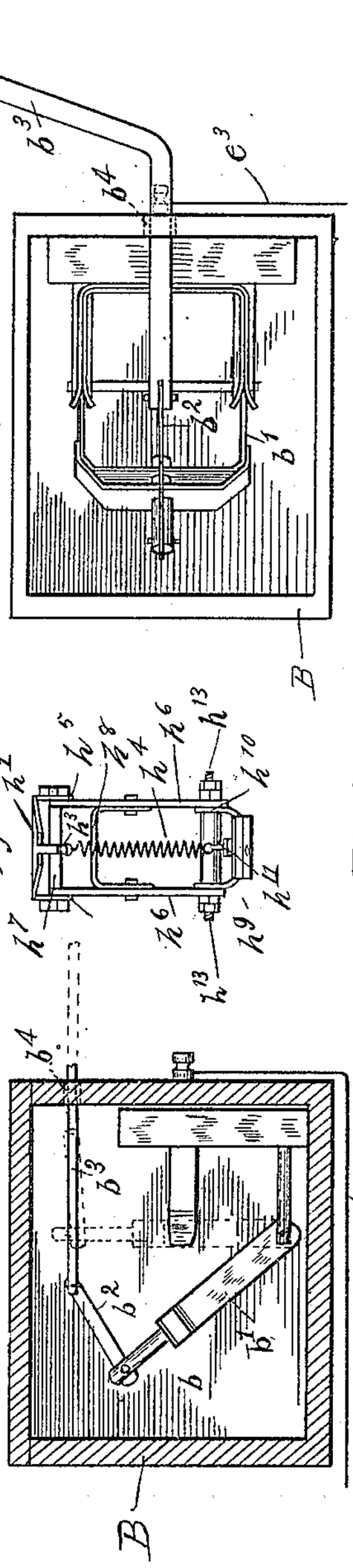

Fig. 6.

Fig. 5.

Fig. 7.

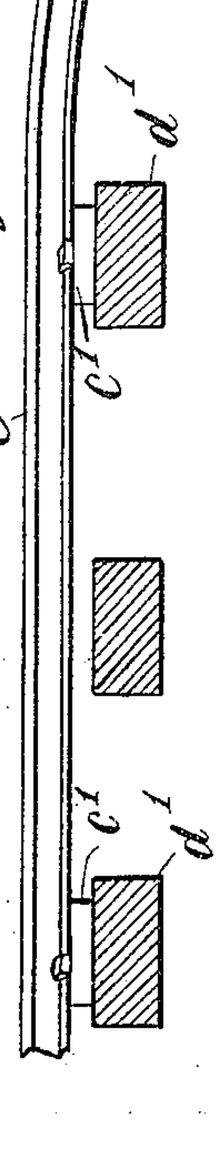

Fig. 8.

WITNESSES
J. H. Bassett.
M. A. Milord

INVENTOR
Emil L. Nolting
By Frederick Benjamin
ATT'y.

UNITED STATES PATENT OFFICE.

EMIL L. NOLTING, OF ELGIN, ILLINOIS.

RAILWAY SIGNAL APPARATUS.

No. 822,625. Specification of Letters Patent. Patented June 5, 1906.

Application filed September 18, 1905. Serial No. 278,831.

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 signaling apparatus, and especially to that class designed to insure the safety of trains when passing switches.

The danger to life and property arising from accidents due to misplaced railway-switches is too well known to require comment, nor is it necessary to call attention to the need of safety appliances of greater efficiency than those now in use, for that fact is obvious.

The object of my invention is to provide simple and efficient means for notifying the driver of an engine or motor-car of the conditions of any switch which he may be approaching by means of an audible signal placed within the cab or upon such motor-car, and I accomplish this end by means partly mechanical and partly electrical.

My invention consists in general of an electromagnetic bell or sounder placed within hearing of the engineer, a third rail located between the main rails of the railroad and connected electrically with a battery through the line-wires, and an electrical knife-switch attached mechanically to the railroad-switch in such manner that the opening and closing of the said railroad-switch will cause a corresponding opening and closing of the knife-switch, the latter being in electrical connection with both the line-wire and the main rails of the railroad, the arrangement being such that when the railway-switch is open the electrical switch is closed, and vice versa.

In the accompanying drawings, Figure 1 is a plan view, partly diagrammatic, of a portion of a railway-line equipped with my open-switch signal device. Fig. 2 is an enlarged view of a railway-switch stand with a switch-box open to show the electric knife-switch and mechanical connection to the rod of the railway-switch. Fig. 3 is a side elevation of the oscillating contact-shoe. Fig. 4 is a side elevation of a locomotive, showing the oscillating contact-shoe, the sounder and electrical connections. Fig. 5 is a longitudinal section of the electric switch-box. Fig. 6 is a plan view of the electrical switch-box with the cover removed. Fig. 7 is an end view of the oscillating contact-shoe. Fig. 8 is a fragmentary view showing one end of the third rail and supports. Fig. 9 is a diagrammatic view of a portion of a railway-line with a side track supplied by an individual circuit.

A represents a railway-switch stand with the ordinary connections.

B is an electric switch-box placed in any convenient position in close proximity to the railway-switch stand. This box may be made of iron and securely locked to prevent its being tampered with. A single-throw electric knife-switch b' is inclosed therein, the operating-rod of which has a link b^2, connecting with a rod b^3, which passes through an aperture b^4 in the switch-box, and is then bent to lie parallel with the operating-rod a' of the railway-switch, to which it is secured by bolts b^5. By this construction it will be seen that opening and closing the railway-switch will cause a corresponding closing and opening of the knife-switch. At a suitable distance from the railway-switch a third rail C is installed, preferably midway between the main rails D D and parallel thereto. Since the rail C is of lighter weight than the main rail, it is supported on blocks c', placed on the ties d', thus elevating it above the track-rails D, the ends c^2 being depressed below the general level of the rest of the rail in order to insure a gradual contact with the oscillating shoe, hereinafter described.

From the telegraph-line wire E used in all railway systems connection is made to the third rail by means of a wire e', which is carried in an underground conduit e^2. The switch-box connection is made to the line E by means of an insulated wire e^3, which is also preferably laid in a conduit e^4.

While the method herein set forth and described is designed to utilize the already-existing lines of wire in use for telegraphing, other methods of obtaining the needed electric current may be made use of, and hence I do not wish to be limited to that precise form of construction. For instance, the installation of a powerful line-battery would in some instances be more desirable, in which case the necessary connections would be made by a two-line system. Again, by connecting the batteries at the local station in series and making use of the same two-line system, the expense connected with the special battery would be eliminated. As a further measure of economy the line wiring the

whole length of the system may be omitted and its place supplied by utilizing only so much of the line-wire as may be necessary, the proper connections being made to take the current from the local-station cells already in use to operate the station-relay instruments, for this arrangement will in no way interfere with the operation of said instruments, since the current would be used only when these conditions were present under which the signal would be utilized, and this would be exceptional. Still further, if desired, current may be supplied to each individual circuit by separate cells or batteries, as clearly set forth in Fig. 9. It will be seen that by locating the battery N′ between the switches, as shown, when the engine makes connection between the third rail C and the main rails D the circuit will be completed for that switch which is being approached, and if said switch is open a warning will be given to the engineer. In a two or four track system the same battery can be used for the circuits on all the tracks by extending the wires e' e^3 to the other tracks, as seen at e^5.

At any convenient point in the engineer's cab F is located a magneto-electric bell G, being suitably insulated from the metal construction to avoid short-circuiting. I do not wish to be limited, however, to this form of indicator, since any design of an audible indicator may be utilized, and especially that construction in which a pivoted armature is a feature and which will operate equally well on a strong or weak current. In order to make positive electrical contact between the connecting wires of the electro-magnetic bell G and the third rail C, I provide an oscillating contact-shoe H, preferably located beneath the pilot I of the engine in the median line and at a suitable height to come in contact with the raised portion of the third rail throughout its entire length.

A plate h' is secured to a block i', being separated therefrom by suitable insulating material h^2. At each extremity the plate h' is extended into a hook h^3 for the attachment of a spiral spring h^4, the central portion having ears h^5, bent at a right angle with said plate. Arms h^6, rigidly secured together by a cross-brace h^8, are pivotally attached to the ears h^5 by means of a rod h^7. The lower ends of arms h^6 carry a plate h^9, having ears h^{10}, which are pivotally attached to the said arms h^6 and secured by lock-nuts h^{13}. Plate h^9 has loops h^{11}, to which are attached the springs h^4, the latter being preferably made of some non-corrosive material. The plate h^9 carries a removable friction-plate h^{12}, which comes in contact with the third rail C and may be renewed whenever worn or deteriorated from any cause. This form of shoe-contact presents important features of special utility, since the construction affords great motility combined with extreme resiliency, permitting a movement in either direction without interfering with its function and insuring a positive and uninterrupted contact between the friction-plate h^{12} and the third rail C at whatever rate of speed the engine or motor-car to which it is attached may be moving. A suitably-insulated wire K makes electrical connections between one binding-post g' of the electromagnetic sounder G and the plate h' or other metal portion of the contact device H, while from the other binding-post g^2 of the sounder a wire L makes electric connections with some metal portion 12 of the engine having direct connection with the wheels, which are in contact with the track-rails.

It will thus be seen that proper provision is made by the mechanism hereinafter described for positively insuring the passage of an electric current through the electric sounder G whenever the shoe H comes in contact with the third rail, as hereinafter is more fully set forth.

The method of operation of my improved open-switch signal device, because of the simplicity of the mechanism, will be readily understood by those skilled in the art, and I need, therefore, only briefly indicate the way in which the audible signal is made manifest to the occupants of the engine-cab when approaching a misplaced switch.

When the railway-switch A is in the position shown in Figs. 1 and 2, the main railway line being open, the rod b^3, being secured to the switch-throw rod a', as already indicated, will be in its extended position, and will thus hold the electric switch b' in its open position, preventing the passage of the electric current through the connections, in which case, it is obvious, the traffic will not be interfered with, since the engineer will get no signal when the engine is passing over the third rail. If, however, the railway-switch A is in an open position, as shown in dotted lines in Fig. 2, the rod b^3, being in its retracted position, will hold the poles of the electric switch in contact, and when the oscillating shoe H comes in contact with the third rail, the electric circuit, through the signal device being completed, the engineer will be positively notified of the danger in time to bring his train to a stop before reaching the switch.

The operations of the device may be more clearly understood by describing the current as passing from the battery N through the line-wire E to the switch-box by means of connections e^3, thence through the connections of rod b^3 to the rails D of the main line, being taken up by the wheels and metal portions of the engine, whence the circuit is through the sounding device G by means of the wires L and K to the shoe H, and this being in contact with the third rail the current will continue through the wire e' to the line-wire. It will be readily understood by those skilled in the art that this direction of

current may be reversed with precisely the same result.

It is obvious that many deviations may be made in the form and construction of the apparatus involved in my invention without departing from the spirit thereof; but,

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

1. In an electric signaling apparatus the combination of a railway-track and switch, an electric switch, mechanical and electrical connections between said switches, a sectional third rail located adjacent to said track-switch and between the rails of the track, electric connection between said rail and a line-telegraph wire and electric connections between said electric switch and one of the line-telegraph wires.

2. In an electric signaling apparatus the combination of a railway-track and a track-switch, an electric switch, mechanical and electrical connections between said switches, a sectional third rail, arranged near the track-switch, electric connection between said electric switch and one of the line-telegraph wires, an electromagnetic sounder, electric connection between said sounder and the third rail and means for making electric connection between the third rail and said railway-switch.

3. In apparatus for the purpose specified the combination of a railway-track, a railway-switch, an electric switch mechanically and electrically connected with the rails of said railway and electrically connected with a line-telegraph wire, a sectional third rail arranged adjacent to said railway-switch, electric connection between said third rail and a line-telegraph wire, an electric signal apparatus, means for electrically connecting said signal apparatus with an electric conductor and means for electrically connecting said third rail with the electric switch.

4. In apparatus for the purpose specified, the combination of a railway, a mechanical switch therefor, an electric switch both mechanically and electrically connected therewith, a battery, a third rail having electric connection with said battery, electric connection between said battery and the electric switch, a motor, an electromagnetic bell arranged on said motor and means for making connection between said bell and the third rail, said means comprising a convex rockably and yieldingly mounted shoe, and means for making electric connection between the bell and said electric switch.

5. In an electric signaling apparatus for railways, a railway-track, a rail-switch, a sectional electric conductor paralleling the rails of said railway and located near said switch, a motor-vehicle adapted to travel on said railway-track, and provided with an electromagnetic signal, a battery, an electric switch, electric connections between the battery and the signal and between the battery and the rails of said railway-track, a rocking flexibly-held contact attached to said motor-vehicle and adapted to engage said electric conductor and electric connection between the signal and said flexible contact.

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

EMIL L. NOLTING.

Witnesses:

WILLIAM HUELSTER,

FRED C. NOLTING.