(No Model.)

E. L. ORCUTT.

ELECTRIC RAILWAY SIGNAL.

No. 272,464. Patented Feb. 20, 1883.

Fig. 1.

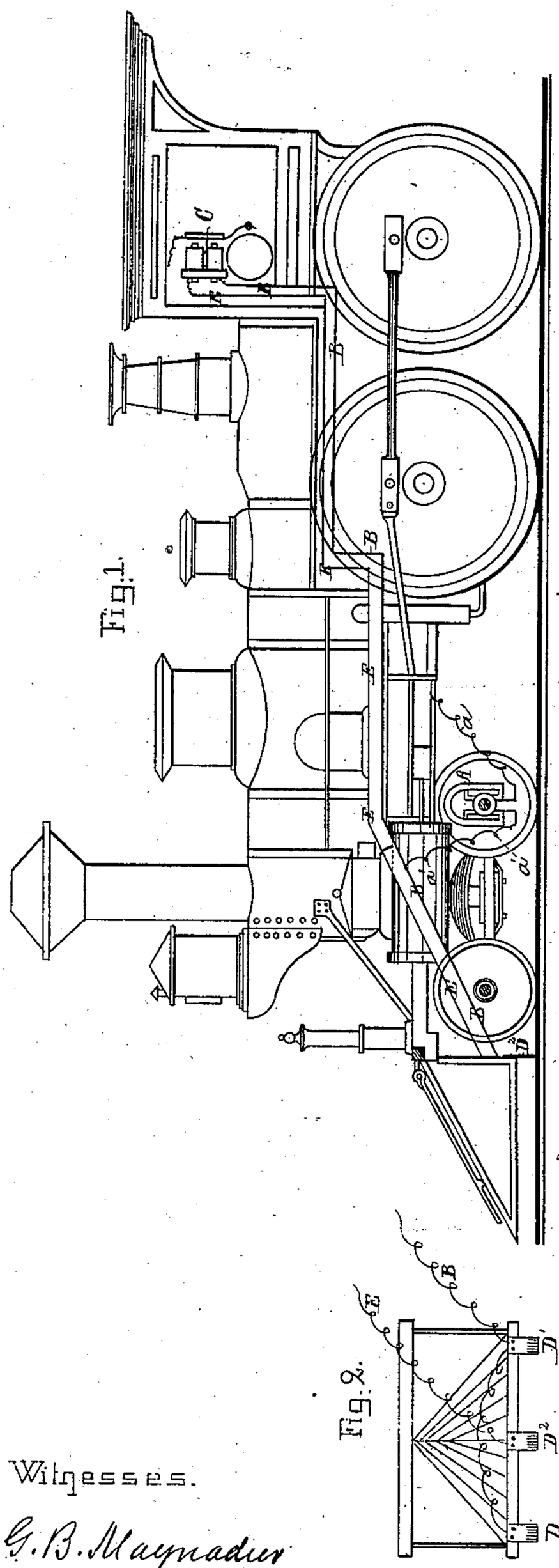


Fig. 2.

Fig. 3.

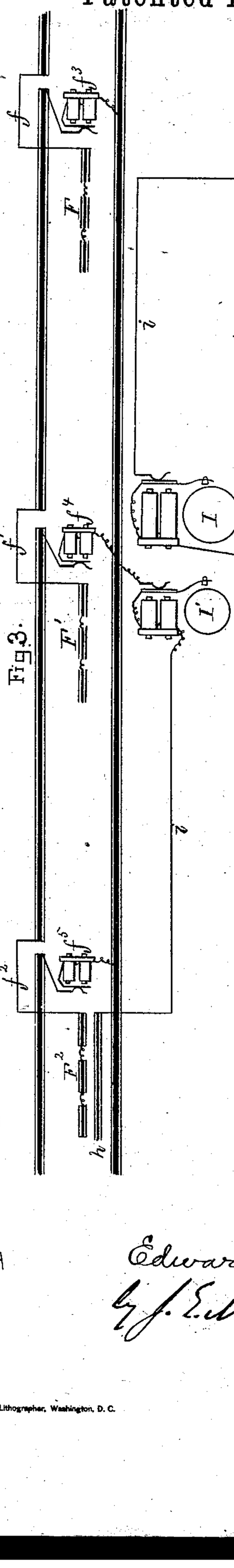
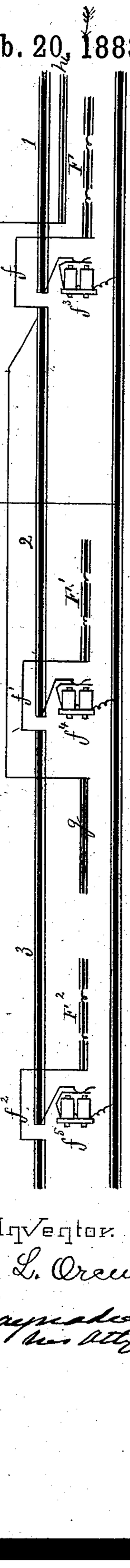


Fig. 4.



Witnesses.

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EDWARD L. ORCUTT, OF SOMERVILLE, MASSACHUSETTS.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 272,464, dated February 20, 1883.

Application filed November 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWARD LEVI ORCUTT, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Railway-Signals, of which the following is a specification.

My invention relates to improvements in electrical circuits in which one rail of a railway-track is divided into insulated sections of any desired length and the electric current is sent from one section through another section and back through the other continuous rail; and the objects of my improvements are to give an audible signal to the engineer, by which he will know whether the section ahead is free or not from obstructions, and also whether a part of his train has been left on the section just passed over, and to signal the approach of a train to a station or road-crossing. To attain these objects I arrange the circuits and electric generator as shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a locomotive, showing the location of the dynamo-generator and its connections with the alarm in the cab and the contact-brushes in front. Fig. 2 shows the manner of attaching the contact-brushes to a cow-catcher. Figs. 3 and 4 show a double-track railway with my circuits, and may be considered separately to illustrate the arrangement for a single track.

A dynamo-electric machine, A, is operated by an axle of any one of the wheels and furnishes the current for actuating all the signals. It will be obvious that the power required will be insignificant, and that the requisite current might be obtained from any of the well-known batteries; but these latter are objectionable and require constant attention, so that I prefer to use the dynamo-machine, as above stated. This dynamo-machine A is connected to the iron-work of the engine, and through that to the rails by the wire *a*. A wire, *a'*, connects it to a wire, B, which connects the coil of one pole of the magnet C in the cab with the two contact-brushes D D', placed at the sides of the cow-catcher, as shown in Fig. 2. The central contact-brush, D^2, is connected to the coil of the other pole of the magnet C by a wire, E, thereby forming an incomplete circuit, which is closed to give the signals, as hereinafter set forth. To complete the circuit for sounding the alarm in the cab, I place one or more contact-plates, F F' F^2, midway between the rails. These contact-plates are preferably made of old rails—say thirty feet long—placed some distance apart and about one-quarter of a mile from the end of each section, or at least far enough to allow the train to be stopped on that section. They are all electrically connected to the insulated rail of a section adjacent to the one they are in by means of the wires *f f' f²*. Each insulated section is connected with the continuous rail opposite by the wires and the spring-supported armatures of the magnets f^3 f^4 f^5 on the well-known principle of automatic circuit-breakers. All the switches are arranged to make an electrical connection between the rails when open to a siding. The circuit-breakers are always located so that they will make the longest possible circuit. The object of this is that any obstruction or the like will shunt-circuit them and cut them out. Suppose the engine (moving as indicated by the arrow) to be near the end of section 1. The central contact-brush, D^2, will strike the first of the plates F and complete the circuit from the generator A through the wire B, the magnet C, the wire E, contact-brush D^2, contact-plate F, wire *f*, insulated section 2, circuit-breaker f^4, the continuous rail, the iron-work of the engine, the short wire *a'*, to the generator A, and thereby cause a rapid vibration of the armature of the magnet C and a continuous ringing of the gong in the cab, which is the signal for "all clear." Now, suppose section 2 to be obstructed by a train or detached car or a misplaced switch, or anything that will make an electrical connection between the insulated rail and the continuous rail, so as to form a shorter circuit than that through the circuit-breaker, as above described, it is evident that such obstruction will cut out the circuit-breaker f^4, and, instead of a continuous rapid ringing of the gong in the cab, there will be but one blow while the brush is in contact with a plate. This is the signal for "danger," and the engineer would be governed accordingly. After passing a section the engineer is notified of its being left clear or whether it is obstructed by one or more cars having become detached by means of contact-plates *g*, (one of which only is shown

in the drawings,) through which the current is sent backward in the same manner as before described. These plates *g* also serve as advance signals for an engine backing up. Of course in a single-track railway both sets of contact-plates are requisite. The signals I I′ at stations, draw-bridges, road-crossings, &c., are similarly operated by the contact-plates *h*, on one side of the center of the track and the contact-brushes D D′ on both sides of the cow-catcher, two of these brushes being used, so as to insure contact whichever way the engine may be moving. The current is conveyed to the signals by the wire *i*. On a double-track road, however, the continuous rail of the other track may be used for this purpose. A suitable switch is placed on the incomplete engine-circuit, within reach of the engineer, by means of which he can complete this circuit at any time, so as to ascertain, in case of failure to receive a signal, whether the fault is in the generator or engine-circuit or in the track-circuit. The engineer soon becomes accustomed to hearing the signals at certain points on the road, and a failure of such signal, from any cause, will attract his attention as readily as the sounding of the alarm would have done. For this reason audible signals are much to be preferred, as a security against accident, to the visible signals usually employed in railways.

I claim as of my own invention—

In an electric circuit for railway signaling, the combination of an automatic circuit-breaking connection between an insulated section of one rail of a track and the other continuous rail, contact-plates electrically connected to the insulated sections, and contact-brushes, generator, and alarm on the engine, forming parts of an incomplete circuit, which is completed only when a contact-brush touches one of the contact-plates, the circuit-breaking connection being located as described, so as to be short-circuited or cut out by the wheels of a car or the like on its section, as set forth.

EDWARD L. ORCUTT.

Witnesses:

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