(No Model.) 3 Sheets—Sheet 1.

J. H. FARRAR.

ELECTRIC RAILWAY SIGNAL.

No. 369,929. Patented Sept. 13, 1887.

Fig. 1.

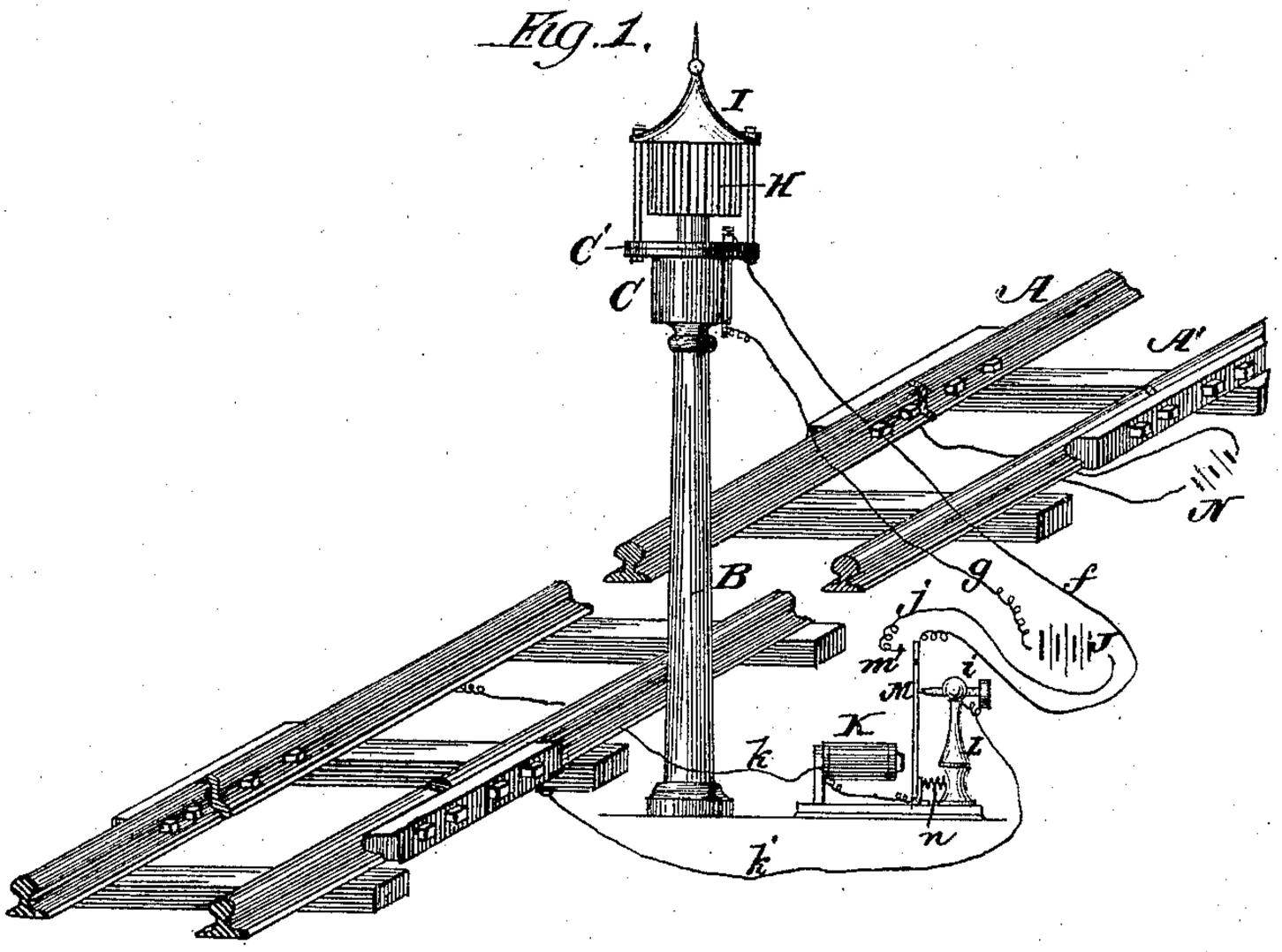


Fig. 3.

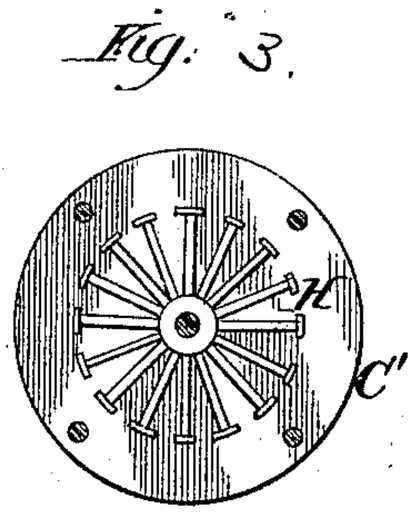


Fig. 4.

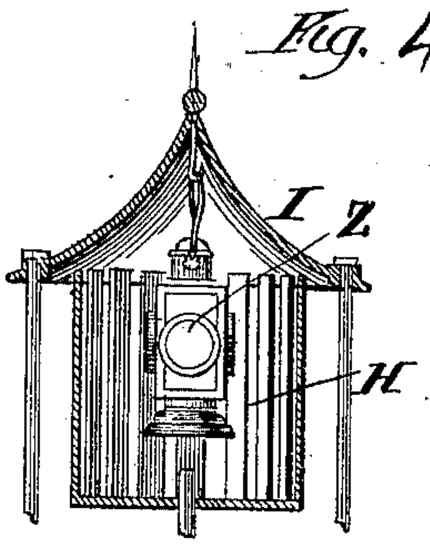
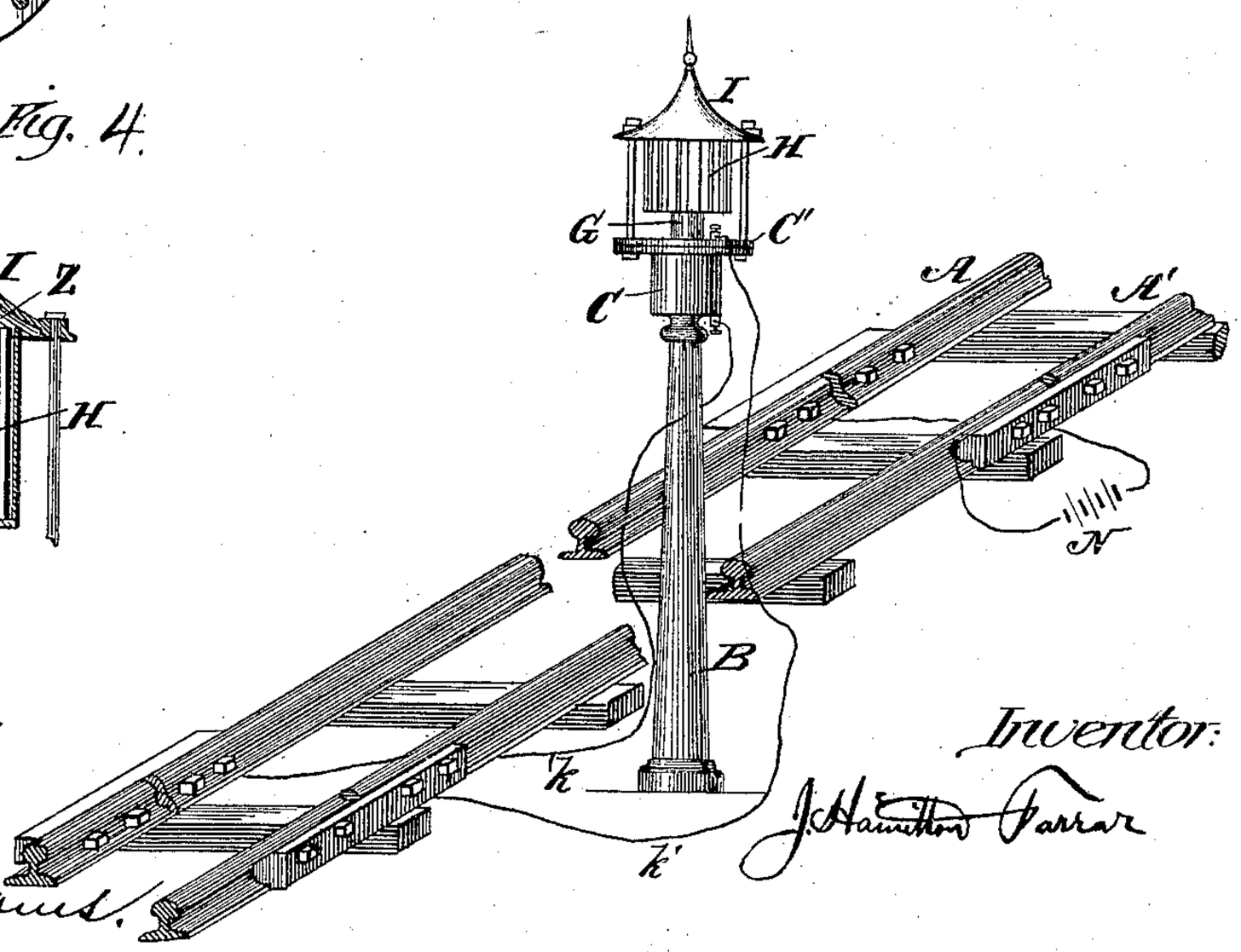


Fig. 2.



Witnesses:
C. W. Bond.
Albert H. Adams.

Inventor:
J. Hamilton Farrar

(No Model.) 3 Sheets—Sheet 2.

J. H. FARRAR.

ELECTRIC RAILWAY SIGNAL.

No. 369,929. Patented Sept. 13, 1887.

Fig. 5.

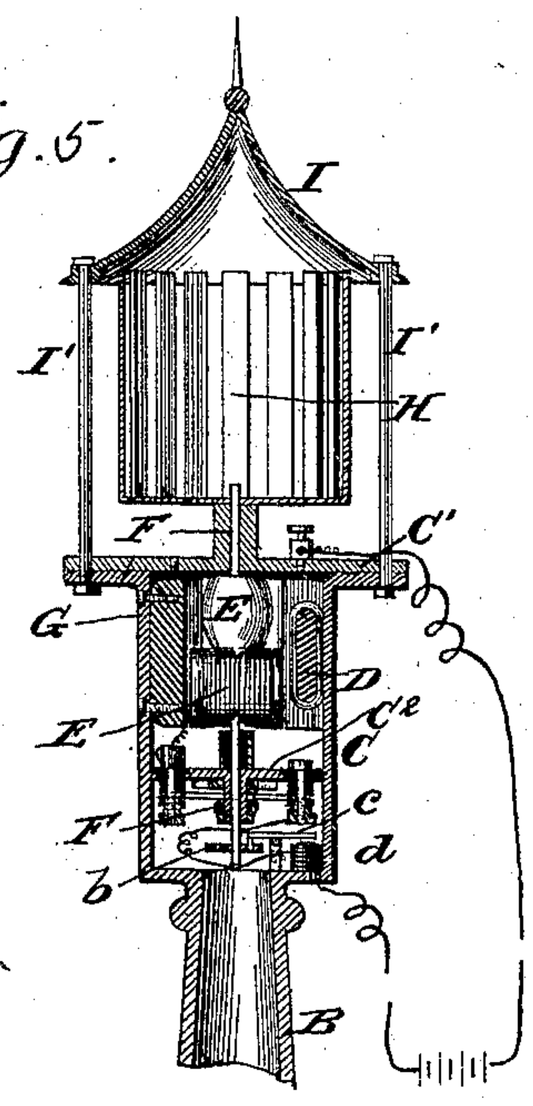


Fig. 6.

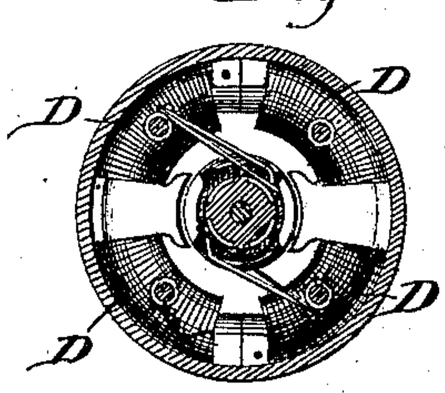
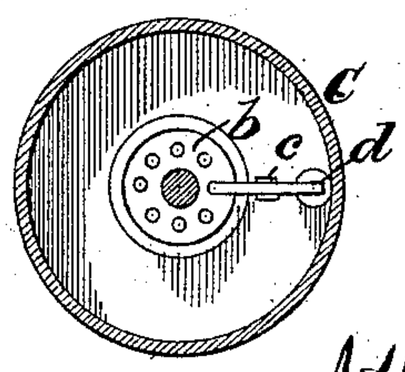


Fig. 7.



Witnesses:
O. V. Bond.
Albert H. Adams.

Inventor:
J. Hamilton Farrar

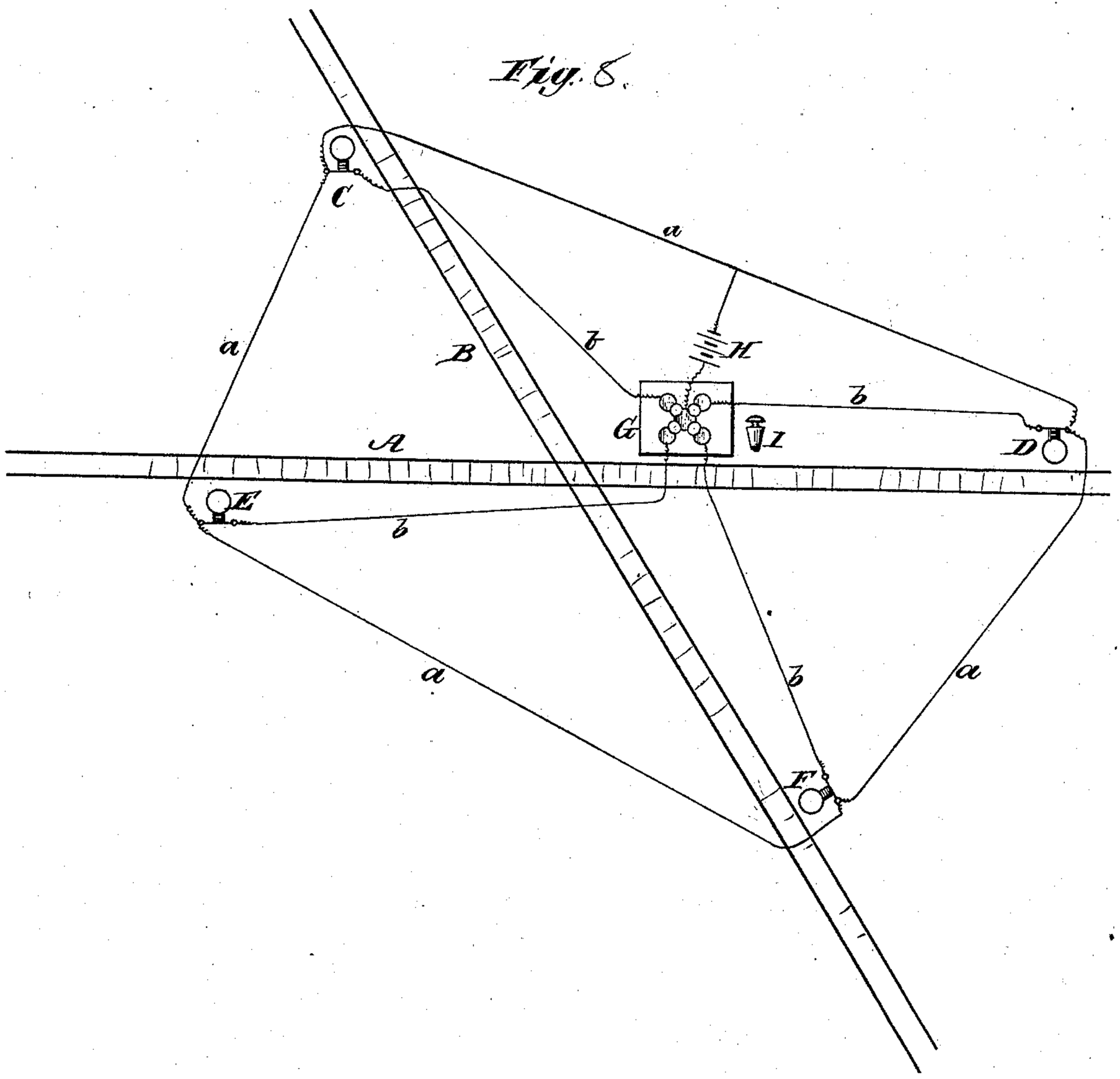
(No Model.) 3 Sheets—Sheet 3.

J. H. FARRAR.

ELECTRIC RAILWAY SIGNAL.

No. 369,929. Patented Sept. 13, 1887.

Fig. 6.



Witnesses.
Robt Everett.
J. A. Rutherford

Inventor.
John H. Farrar.
By Wash & Bond.
Attys.

UNITED STATES PATENT OFFICE.

J. HAMILTON FARRAR, OF CHICAGO, ILLINOIS.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 369,929, dated September 13, 1887.

Application filed July 21, 1882. Serial No. 67,365. (No model.)

To all whom it may concern:

Be it known that I, J. HAMILTON FARRAR, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Electric Railway-Signals, of which the following is a full description, reference being had to the accompanying drawings.

The present invention relates to that class of railway signaling apparatus in which electro-mechanical signaling devices are included in electric circuits formed by sections of the railway-track.

It has been customary in railway block-signaling systems to divide the railway-track into sections of a determined length and insulate the same from each other at the joints, the rails of each section being metallically connected, so as to form a metallic circuit for electro-mechanical signaling devices. My invention is a departure from such prior systems in so far as it relates to the character of the signaling device and the electric circuit which brings the same into action. I propose to use a visual signal, which is maintained in a constant state of activity during the period of time when no train is running upon the track-section to which said signal belongs. The signal receives a rotary movement, and it can be adapted for day or night use.

The means for actuating the signal consist of an electrical circuit, which is generally formed by the rails of the insulated track-section, and a battery or other source of electricity. A vibratory circuit-breaker or rheotome inducted in the normally-closed circuit is combined with the rotary signal, and the latter is operated by an electric motor of any approved construction, the latter having commutator devices, which are connected with the closed track-circuit, so that a constant rotary motion will be given to the signal when the track-section is not occupied by a train. The battery included in the track-circuit may furnish the electric current for operating the motor of the signal; but it is also proposed to use a separate battery for said motor, and to make and break its circuit in rapid succession by a rheotome included in the main or track circuit. Normally, when the track is clear, the signal rotates, so as to indicate "safety" ahead to an engineer of an approaching train; but when the track is occupied by a train the circuit is then through the wheels and axle of the car, and the signal included in the particular section upon which the train is running is brought to a state of rest, so as to indicate "danger" ahead. Furthermore, the signal also serves as a warning against broken rails, open draw-bridges, a misplaced switch, or cars which have not fully passed from the main track onto a siding.

The invention, briefly outlined in the above description, will he hereinafter more fully described, and then set forth in the claims.

In the drawings, Figure 1 is a perspective view of a railway signaling apparatus having two electric circuits. Fig. 2 is a similar view showing a single circuit and a revolving signal driven by an electric motor. Figs. 3 and 4 are detail views of a revolving signal-cage and supports. Fig. 5 is a vertical sectional view of the electric motor, its housing, and rotary signal-cage. Fig. 6 is a cross-section showing the electric motor, its housing, and commutator devices. Fig. 7 is a detail view of the locking device for the rotary signal. Fig. 8 is a diagram view of intersecting tracks and signals included in wire circuits.

The reference-letters A A′ indicate the rails of a railway-track, which is divided into sections of a mile (more or less) in length by properly insulating the joints between each section and metallically connecting the rails of each section. Such method of dividing a railway-track is well understood, and need not be further described. Each section of a railway-track thus divided or insulated from an adjoining section contains a signaling apparatus, which may be constructed and arranged in any of the ways hereinafter referred to.

In Figs. 1 and 2, the letter B designates a vertical column, which is embedded in the ground alongside the track. At the top of this column is a housing or casing, C, which

contains an electric motor and its adjuncts, the same being inclosed by a cover-plate, C'. The electric motor may be of any approved type, and I have in the present instance shown one consisting of a coiled revolving armature, E, and surrounding field-magnets D. The shaft or axis F of the armature has its bearings in the cover-plate C' and in a horizontal plate, C^2, within the housing, so that said armature can freely revolve. The armature-shaft may carry the customary current disk or hub, against which bear brushes (seen in Fig. 6) for conveying the electric current to the field-magnets. Any other form of commutator devices may, however, be used, as will readily be apparent.

The shaft of the armature E carries a disk, *b*, which has a series of holes, as is seen in Fig. 7. A vertical pin on the end of an armature, *c*, is adapted to enter said holes for the purpose of arresting the rotation of the armature. The armature *c* co-operates with an electro-magnet, *d*, which is included in the circuit which feeds the electric motor. When the track is clear and the current is passing through said circuit, the magnetization of the core of the electro-magnet *d* will hold the armature against the core and the pin disengaged from either of the holes in the disk *b*. The motor is then free to revolve for the purpose of imparting a corresponding motion to a signal-cage, H, carried at the top of its shaft F. This signal is formed of a bottom plate and a series of vertical slats arranged to form an open-work drum. The bottom plate may also be dispensed with and slats used instead, as is seen in Fig. 3. The cage H is placed beneath and protected by a hood, I, which is supported upon the cover-plate C' by vertical bolts or rods I'. The signal-cage, for day use, may be painted in various ways, so as to obtain the best ocular effects, and for night use a lantern, Z, is suspended within the same from the hood I, as is seen in Fig. 4. The light from said lantern shines through the slotted cage, and is seen from all points of the compass, and in such respects it differs from an inclosed signal, which cannot be observed except on certain lines, or an open signal, which also is observable only in certain lines, and does not present the same appearance if viewed in other lines. The current which drives the electric motor may be derived from a line-battery, N, as is seen in Fig. 2, or from a local or second battery, as is shown in Fig. 1. In the most simple arrangement—viz., that shown in Fig. 2—the battery N of a sufficient electro-motive force is connected with the track-rails, and the circuit is completed through the motor by connecting the latter by wires *k k'* with the track-rails. It is apparent that in this instance the current is constantly flowing through a normally-closed circuit, and that the commutator devices enter into service for properly supplying it to the motor, and hence rotating the same. When short-circuiting, however, takes place by reason of the presence of a train on the track-section, including such particular motor, the motion of the latter ceases, and the signal also comes to a stop. In the arrangement shown in Fig. 1 a second or local battery, J, furnishes the current for operating the motor and signal. The line or track battery N is in the present instance connected with the rails, and the latter are connected by the wires *k k'* with a rheotome, which controls the circuit of the battery J and sends intermittent currents to the motor. The rheotome referred to comprises the electro-magnet K, the vibrating armature M, the post L, stop-pin *l*, and spring *n*.

The armature M has an upper insulated terminal, *i*, with which is connected a wire, *f*, extending to the electromotor, a second wire, *g*, extending from one of the poles of the battery J; also making connection with the motor. The other pole of said battery is connected by a wire, *j*, with a contact, *m*, against which the armature M strikes to close the circuit of the battery J.

It is not essential to the success of my invention that the signals be included in electric circuits formed in part by insulated track-sections; and instead of controlling the electric current which acts upon the signals automatically by passing trains, broken rails, open draw-bridges, or otherwise, such current may be controlled by means of a switch operated by a signal-man.

In Fig. 8 I have shown two railway-tracks, A B, crossing each other. C D E F are signals of the character above described, and connected by wires *a* and *b*, with a manual switch, G, the latter being connected with one pole of a voltaic battery, H, and one of the wires, *a*, being connected with the other pole in order to complete the circuit.

It is understood that in such arrangement of signals in connection with a crossing, the signals are controlled by an operator located in a tower to admit trains at his will. The signal belonging to the track upon which a train is to pass is rendered active by the proper insertion of the key or plug I into one of the open key-holes of the switch-board. The manner of sending the electric current to the different signals at the will of the operator will be readily understood, and it is obvious that when one signal is operating to indicate "safety" the others are at a state of rest to indicate a reverse condition.

Having thus described my invention, what I claim is—

1. In a railway signaling apparatus, the combination, with an electric motor comprising a rotary armature, stationary field-magnets, and an arbor or shaft carrying the armature, of a box or cage shaped signal mounted upon the armature-shaft and capable of being turned continuously in the same direction and presenting the same appearance when viewed from different points of the compass, substantially as herein set forth.

2. A railway signaling apparatus compris-

ing a track or main electric circuit, a rheotome included in the latter, a second or local electric circuit connected with said rheotome, and an electric motor and signal device included in the local circuit, substantially as described.

3. A railway signaling apparatus comprising an electric motor, a slotted cage mounted on its revolving armature-shaft, a housing for the motor, a covering-hood for the revolving cage, and an electric circuit formed by insulated track-rails and metallic connections, substantially as described.

J. HAMILTON FARRAR.

Witnesses:
ALBERT H. ADAMS,
GORDON H. NOTT.