(No Model.) 2 Sheets—Sheet 1.

D. H. APPLEGATE.

AUTOMATIC ELECTRICAL RAILWAY SIGNAL.

No. 285,944. Patented Oct. 2, 1883.

Fig. 1.

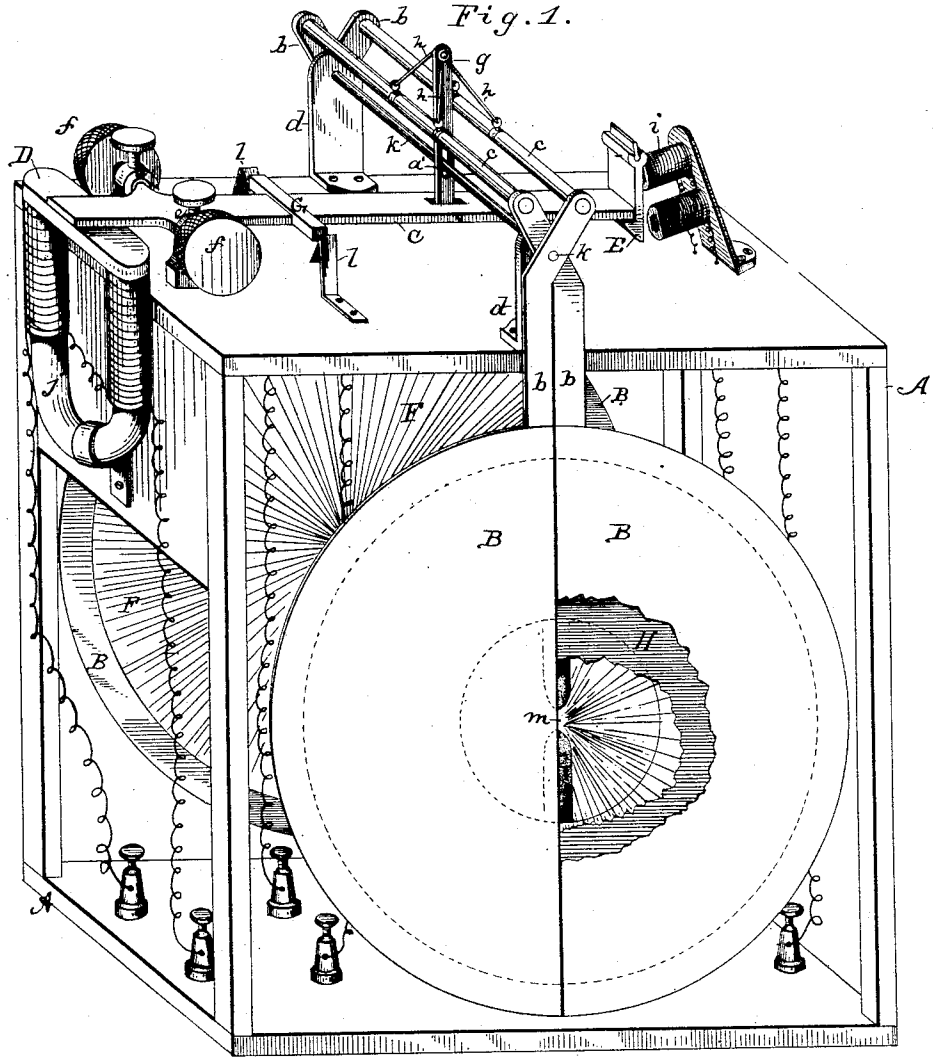
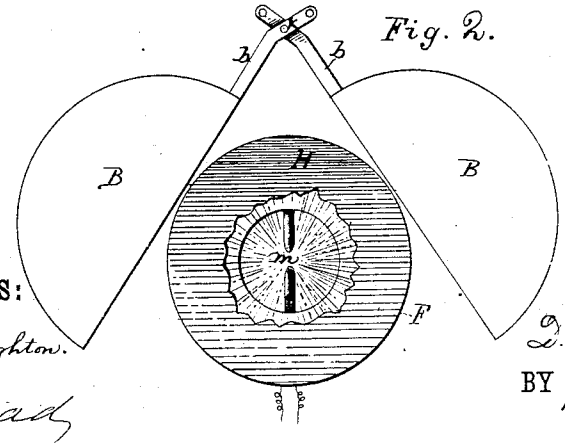


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

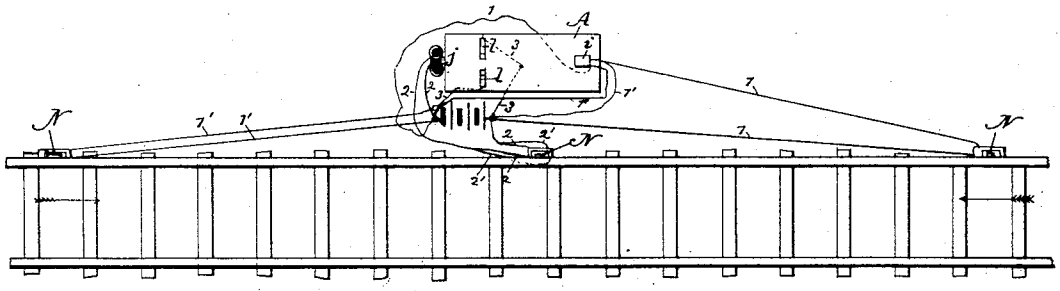


Fig. 6

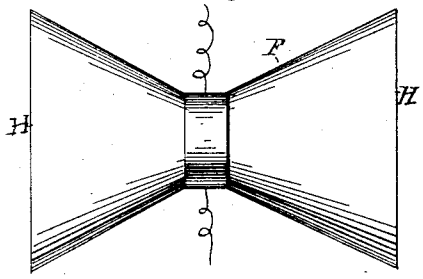


Fig. 5

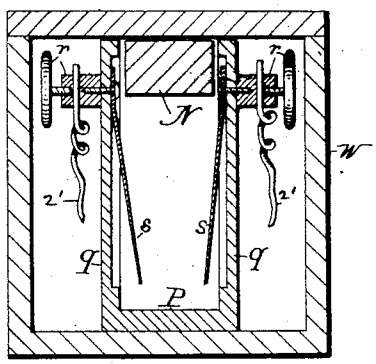
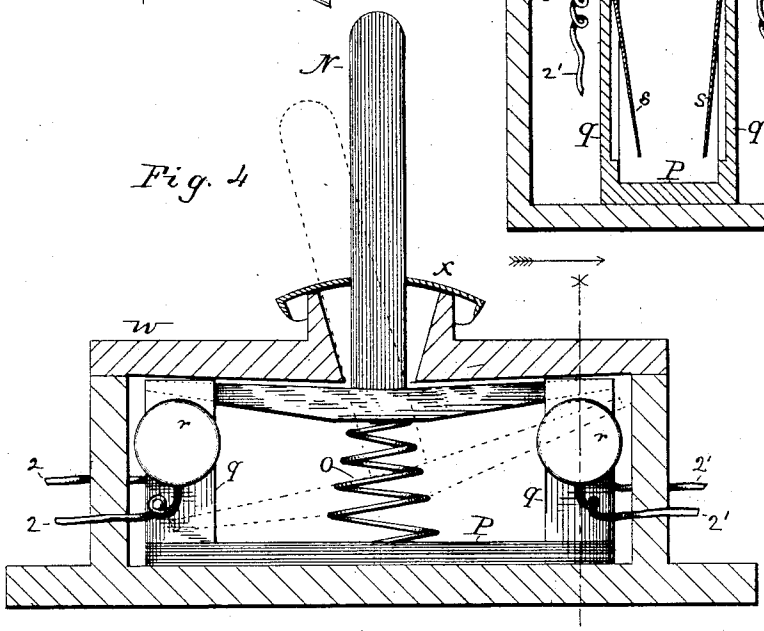


Fig. 4



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UNITED STATES PATENT OFFICE.

DANIEL H. APPLEGATE, OF RED BANK, NEW JERSEY.

AUTOMATIC ELECTRICAL RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 285,944, dated October 2, 1883.

Application filed May 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. APPLEGATE, a citizen of the United States, residing at Red Bank, in the county of Monmouth and State of New Jersey, have invented a new and useful Automatic Electrical Railway-Signal, which I term "The Automatic Gravity Railway-Signal," of which the following is a specification.

My invention relates to improvements in automatic elevated railway-signals; and it consists in the peculiar construction and arrangement of the parts, as hereinafter more fully set forth, and pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective view of my improved signal-box and the electric mechanism connected therewith. Fig. 2 is a front view of the signal with the disks open. Fig. 3 is a plan view, showing the circuit and track connections. Fig. 4 is a side elevation, partly in section, of my improved circuit-closer inclosed in a box. Fig. 5 is a vertical section on line *x x* of Fig. 4, and Fig. 6 is a side elevation of my improved double reflector.

Similar letters refer to similar parts throughout the several views.

Fig. 1, A A, with the corner-posts, constitutes the frame-work of the signal. The semi-circular disks B B are secured to the arms *b b*, which said arms swing freely on the rod *k*, which passes through the supporting-posts *d*. That the semi-disks B B on both sides of the signal may act together, the arms *b b* on either side are connected securely by the rods *c c*. The semi-disks B B can be made of any suitable material, which should be, however, as light as is consistent with durability. I prefer to use papier-maché or cork. These semi-disks are covered or coated on the outside with a phosphorescent or luminous substance, compound, or material. This application makes the signal continuously visible, and thereby its locality is indicated at night without the aid of artificial light.

To the rods *c c* are attached hinges or governors *h h*. These governors connect with the upper end of the bar *g*, which said bar is also connected with the lever C. The bar *g* is slotted at *a'* for the passage through it of rod *k*, to admit of a free upward movement of the lever C. The rod *k*, running through the bar *g*, prevents an oscillating movement of the disks B B, and tends to hold them firmly in place, whether open or closed. The lever C is pivoted at the posts *e e* by the set-screws *f f*. The armature D is attached to the end of the lever C in close proximity to the set-screws *f f*. The armature, together with the lever C, is actuated by the electro-magnet *j*. The lever C is held in place, when the signal is covered, by the combined armature and latch E, which is hinged to the electro-magnet *i*.

The disk H, Fig. 2, is a partially-transparent colored disk attached to the ends of the reflector F, which said reflector F is secured to the lower part of the frame-work A. An opening is left in the center of the reflector F for the admission of the lamp *m*. I prefer to carry out this feature of my invention by making use of any practical electric lamp in the following manner: One of the electrodes of a battery is connected by a proper conductor with the lamp *m*. The other electrode is connected with one of the brushes *l* on the upper part of the frame-work A. From the other brush *l* a conductor leads to the lamp *m*. These brushes are made of thin metal, and bent to form a weak spring, and are so set that when the signal is covered, the lever C then resting on the latch E, the circuit-closing bar G is not in contact with said brushes. When the lever C is dropped, thereby exposing the signal, (see Fig. 2,) the circuit-closer G comes in contact with the brushes *l*, thereby closing the circuit, and furnishing a current to the lamp as long as the signal is exposed. By the use of this device I am enabled to furnish the signal with light at such times only as it is necessary—to wit, when the signal is exposed—and this effect is produced by the use of a local battery, connected as aforesaid. A cut-out may be made in any part of the circuit adaptable to remain open in the day-time, and to be closed at night by a switch-pin or its equivalent.

My method of operating the signal is shown by the device illustrated in Fig. 4. This device or circuit-closer is actuated by the wheels of a passing train pressing down the key N. The spring O, attached to the plate P and to the key N, serves to keep the key in place, as

well as for the purpose of breaking the circuit, by raising the lower arm of the key N out of contact with springs or brushes *s*. The arms of the key N are slightly inclined upward, and are held securely against the top of the box W, Fig. 4, by the spring O.

The connecting-posts *q* (see Fig. 5) are made of some non-conducting material, and are attached to the plate P. The arms of the key N work freely between these posts. The binding-posts *r* are set in the connecting-posts *q*, and hold, on the inner sides of said posts, the springs or brushes *s*. The posts *q* are cut out on the inside for the reception of the brushes *s*. This circuit-closer is placed in a box, W, Fig. 4, of convenient size and form, with an opening or key-hole at the top, for the play of the key N.

Attached to the key N, just above the key-hole in the box W, is a cap, *x*, made of some water-proof material, which should also be flexible, and of sufficient size to keep the key-hole continually covered. The cap works, with the key, freely over the key-hole. The object of this cap is to exclude water and dirt from the circuit-closer.

The details of the practical working of the signal are as follows: The frame A, with the signal attachments and apparatus, as described, is placed in a suitable box or case erected on appropriate frame-work over or near the track. This frame-work and box or case, forming no part of my present invention, are not illustrated in the drawings. The battery to supply the eletrical current is placed for convenience at or near the base of the said frame-work, inclosed in a box for that purpose. I use a local battery for the sake of economy, obviating the loss of electrical force necessarily wasted by the resistance in long lines. The box W, Fig. 4, containing the circuit-closer, Fig. 4, is placed at the side of the rail and bolted securely in position, so that the end of the key N is just above the rail. When the wheels of a train strike the key N it will be depressed in the direction in which the train is moving. The arms of the key N, being a conductor of electricity, will, when so depressed, close the circuit by contact with the brushes *s s*. The circuit-closers aforesaid are placed at distances from the signal varying, of course, with the work which the signal is to perform. For street or road crossings I would make the connections as follows: A circuit-closer is placed on each side of the signal, at suitable distances from it. Another circuit closer is placed at or near the signal, and all by the rail, as aforesaid. I use three circuit-closers for the purpose of saving extra wire and battery.

One of the electrodes of the battery is connected by a suitable conductor, 1, at the binding-post *r* of one of the outer circuit-closers. The conductor 1 leads from said outer circuit-closer to the electro-magnet *i*, and thence to the other electrode of the battery, as shown in Fig. 3, the circuit being broken or cut out at the connecting-posts *q*. When a train is approaching the signal from either direction, the arm of the key N, being depressed by the wheels, closes the circuit and actuates the armature and latch of the magnet *i*, and releases the lever C, which then exerts its gravity on the connecting-rods of the disks B B through the agency of the bar *g* and the governors *h h*, thereby opening the said disks and exposing the signal H, as shown in Fig. 2. At the same time the dropping of the lever C, carrying with it the bar G, closes the circuit leading to the light *m* by contact with the brushes *l l*. This circuit leads directly from the battery, as above described. Another conductor leads from one of the electrodes of the battery to the binding-posts of the circuit-closer which is placed at or near the signal, as aforesaid, and is connected with the binding-posts at each end of the plate P, so that the circuit may be closed by the train, whichever way it may be moving, unlike the distant circuit-closers, which communicate only by the posts on the plate P standing toward the signal, as it is necessary that the latch E should only be actuated when a train is approaching the signal. Therefore the binding-posts of the distant circuit-closers standing farthest from the signal are left neutral, so that when a train is moving away from the signal no connection is made in the circuit passing through the magnet *i*. From the binding-posts of the aforesaid connector standing at or near the signal a conductor leads to the magnet *j*, and thence to the other electrode of the battery, and when a train has approached the signal from either direction and the exposure of the signal is no longer required, the depression of the key N by the wheels closes the circuit passing through the magnet *j*, actuating the armature D and lifting the lever C on the latch E. The disks B B, being thus released, fall by their own gravity and cover the signal, as shown in Fig. 1.

The above principle of connections applies as well to block-signaling, and to signaling in tunnels, cuts, and curves, only in such cases the connectors are placed in such positions and at such distances as to meet the requirements in each case. By this method of arranging the conductors it will be seen that one battery will do the whole work required; but to supply the current for the lamp, an accumulator or secondary battery is most effective and convenient.

The electrical circuits or conductors for the attainment of these objects as above described should be of wire, thus obviating, as far as possible, the detrimental effects of atmospherical or other electrical disturbances, such as are experienced when the earth or rails of the track are used to form a part of the circuit.

The signal as above described will perform all the work that is required of a signal, automatically, without aid or attention, except an occasional recharging of the battery or batteries.

Under rare circumstances it might be convenient to have the disks B B on each side of the signal work independently of each other, in which case the said disks on either side might be actuated by separate levers and magnets. This, however, forms no part of my present invention, but may be made the subject-matter of a future application.

I am aware that prior to my invention an automatic signaling system with electrical illuminating means has been used. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the semi-disks, B provided with the arms *b b* and rods *c c k*, of the lever C, having a slotted bar, *g*, provided with hinged rods *h*, electro-magnet *i*, having a hooked armature, E, and circuit-connections, as described, with a track circuit-closer to be operated by a passing train, circuit-closer G, brushes *l*, lamp *m*, and circuit-connections, as described, whereby the signal is uncovered, and at the same time the lamp is lit, as set forth.

2. The combination, with the semi-disks B, provided with the arms *b b* and rods *c c k*, of the lever C, having a slotted bar, *g*, provided with hinged rods *h*, electro-magnet *j*, electrically connected with key N, operated by a passing train, and a lamp, *m*, with circuit-connections, substantially as described, whereby simultaneously the lamp is extinguished and the signal covered, as set forth.

3. In an automatic electric railway-signal, the combination, with the swinging semi-disks B B, provided with supporting-arms *b b*, supports *d d*, and connecting-rods *k c*, of the lever C, vertical slotted bar *g*, hinged to the rods *c* and at its lower end to the lever C, and electro-magnets *i j*, substantially as described.

4. The combination, with the box *w*, provided with a slotted sliding cover, *x*, of the key N, supported by spring O, terminal springs *s*, secured to binding-post *r*, and non-conducting standards *q*, substantially as described.

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Witnesses:
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