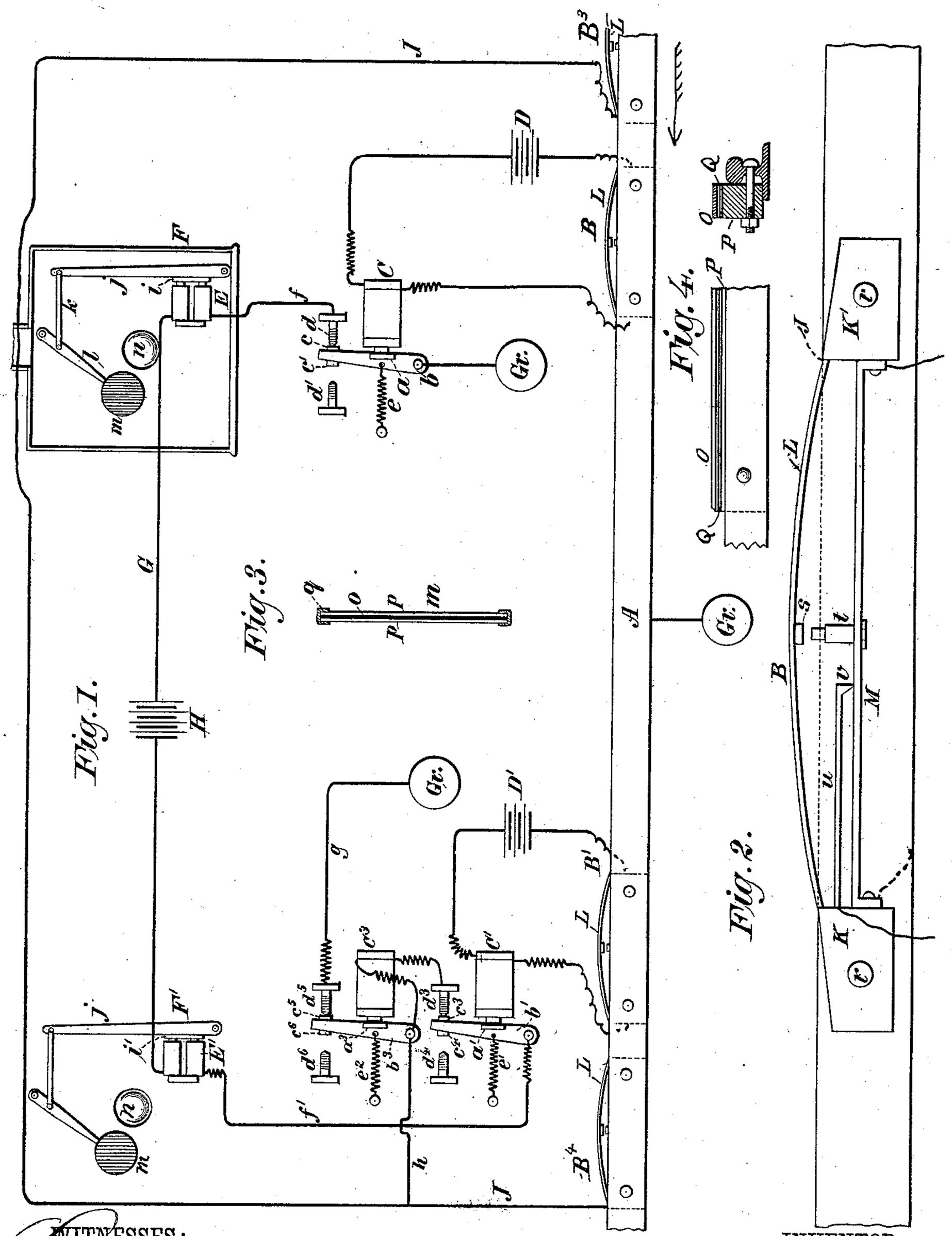
(No Model.)

C. D. TISDALE.

RAILWAY SIGNALING APPARATUS.

No. 316,201. Patented Apr. 21, 1885.



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RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 316,201, dated April 21, 1885.

Application filed August 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. TISDALE, of Boston, Suffolk county, Massachusetts, have invented a new and useful Improvement in Railway Signaling Apparatus, of which the following is a description, reference being had to the annexed drawings, in which—

Figure 1 is a diagram representing the instruments and circuits of my improved electric signaling apparatus. Fig. 2 is a side elevation of the track-instrument. Fig. 3 is a diametrical section of the color-disk; and Fig. 4 is a detail view of a modified form of track-instrument.

My invention consists in an improved arrangement of circuits, track-instruments, and relays, whereby a signal of danger is displayed when a train enters a section to be protected, and is withdrawn when a train leaves a section and the track is clear.

My invention further consists in a signal-lantern provided with a color-disk composed of colored gelatine and mica for changing the color of the light emitted by the signal-lamp, the object of this construction being to provide a very light disk capable of being readily moved by an electro-magnet energized by an electric current under the control of the track-instrument and relays.

It further consists in a track-instrument of simple construction, designed to be operated by the wheels of the passing train and capable of being used as either an open or a closed circuit instrument.

At opposite ends of the track-section A to be protected are placed circuit-breaking track-instruments B B′, which are secured to the side of the track-rail, and are respectively in circuit with the relays C C′ and local batteries D D′. The armature *a* of the relay C is secured to a lever, *b*, whose pivot is connected with the ground, and whose free end carries two contact-points, *c c′*, which are capable of being brought into contact with the screws *d d′*. The armature *a* is drawn toward the relay-magnet C, against the force of a retractile spring, *e*. The contact-screw *d* communicates by a wire, *f*, with the magnet E of the signal-lantern F, and the magnet E communicates by the main-line wire G with the magnet E′ of the lantern F′, located at the opposite end of the section to be protected. The main line G includes a line-battery, H, and the magnet E′ is connected with the pivot of the lever *b′* of the relay C′, and the contact-screw d^3 is connected with one terminal of the relay C^3, whose other terminal is connected with the pivot of the lever b^3. The contact-point c^5 of the lever b^3 is capable of touching the screw d^5, which is grounded through the wire *g*. Track-instruments B^3 and B^4, placed at opposite ends of the section A, are connected by a wire, J, which wire is connected by a branch, *h*, with the lever b^3 of the relay C^3. The track-instruments B^3 and B^4 are arranged on the open-circuit plan, and are closed only when a train is entering the section A. The armatures *i i′* of the magnets E E′ of the lanterns F F′ are attached to levers *j*, pivoted in the base of the lantern and connected by a link, *k*, with a swinging arm, *l*, pivoted in the top of the lantern and carrying at its free end a colored disk, *m*, which is capable of covering the lens or bull's-eye *n* of the signal-lantern. The colored disk *m* is composed of a circular sheet, *o*, of colored gelatine, inclosed between two sheets, *p*, of mica, as shown in Fig. 3, the whole being clamped in a metallic rim, *q*, which is secured to the arm *l*.

The track-instrument shown in Fig. 2 is composed of two blocks, K, of wood secured to the track by bolts *r*, and supporting an arched strip of metal, L, carrying the contact-point *s*, also a straight bar of metal, M, carrying a contact-screw, *t*. To the block K is secured an arm, *u*, having at its free end a contact-point, *v*, which is normally in contact with the bar M. For the local circuits including the batteries D D′, the wires are connected with the bar M, and with the arm *u*, and for the open circuit including the wire J the arched bar L is in electrical communication with the wire J, and the straight bar M is in electrical communication with the track-rail, as indicated in dotted lines in Fig. 2; and the track-rail is connected with the ground, as indicated in Fig. 1.

A train entering the section A in the direction of the arrow, passes over the track-instrument B^3 without producing any effect on

the several circuits; but in passing over the track-instrument B the arched bar L is depressed by the car-wheels, the contact-point *s* is brought down upon the contact-screw *t*, pushing down at the bar M, and breaking the circuit between the said bar M and the point *v* of the arm *u*. The magnet of the relay C becoming demagnetized, the armature-lever B falls back and breaks the contact between the point *c* and the screw *d*, thus interrupting the main-line circuit, including the magnets E E′ of the lanterns F F′, to release their armature and allow the color-disks *m* to drop behind the lenses *n* and tint the light passing from the signal-lamp through the said lens *n*, indicating that the train has entered upon the track-section. The current from the main-line battery H passes normally through the magnet of the relay C^3 and holds the point c^5 in contact with the screw d^5, and is grounded at that end through the wire *g*. When the train enters the section A, as already described, and the main-line circuit is interrupted between the points *c* and *d*, the armature-lever b^3 of the relay C^3 is released and drops back, leaving the main line open, or without a ground, thus preventing the current from flowing through the lantern-magnets E E′, and allowing the color-disks to hang by their own gravity in front of the lenses of the lanterns until a ground to the main line is again furnished. The train in passing over the section A rolls over the track-instrument B′ and produces no other effect than the temporary opening of the circuit of the local battery D′; but when the train passes over the track-instrument B^4 it establishes an electric connection between the wire J and the ground through the track-rails. The magnet of the relay C^3 is now grounded through the wires *h* and J, track-instrument B^4, and the track-rail, and, becoming energized by the current from the battery H, moves the armature a^3 forward, bringing the point c^5 and screw d^5 into electric contact with the ground-connection of the main line through the wire *g*, where it remains until the track-instruments are again operated in the manner already described.

When a train enters the section A from the opposite end, the track-instrument B^4 is operated without producing any effect on the circuits; but when the track-instrument B′ is operated the circuit of the local battery D′ is broken, the armature *a′* of the relay C′ is released and falls back, breaking the contact between the screw c^3 and d^3, destroying the power of the magnet of the relay C^3, permitting the spring e^2 to move the armature-lever b^3, and break the contact between the contact-points c^5 and contact-screw d^5. The main-line circuit being now interrupted, the color-disks *m* drop by their own gravity, covering the lenses *n*, and indicate "danger." The main-line circuit is not again completed until the train in passing off from the section A operates the track-instrument B^3, grounding the wire J through the track-rail, when the current of the main-line battery again passes through the magnet of the relay C^3 and restores the contact between the points c^5 and the screw d^5, and grounds the main line through the wire *g*.

The local circuits may be operated on the open-circuit plan by arranging the track-instruments B and B′ to hold the circuit normally open, and by making the connections with the back contact-screws, d^2 and d^4, of the relays C and C′, instead of with the screws *d* and d^3, as already described.

My improved signal-lantern is designed to be used for both day and night service, the lamp being allowed to burn both day and night. In addition to the light of the lamp, a window will be provided in the lantern-casing, opposite the lense *n*, to allow the daylight to supplement the lamp.

When my improved apparatus is used on the open-circuit plan, I may employ a track-instrument composed of a metal strip, O, clamped to a bar, P, of wood with an intervening strip, Q, of ribbon or other insulating material, as shown in Fig. 4, the bar of wood being clamped to the side of the rail by bolts and the circuit being closed by the car-wheel as it passes over both the rail and the metal strip O.

My improved signal employs but a single system for day and night, and is therefore simple and easily operated and taken care of. The construction of the color-disk *m* is such as to permit of operating it directly by means of an electro-magnet without the intervention of clock-work or machinery of any kind.

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

1. In railway signaling apparatus, the combination of the relays C C′ and their respective local and line circuit connections, the circuit-closing track-instruments B^3 B^4, line J, branch *h*, relay C^3, whereby the main line G is deprived of a ground while a train is passing over the section being protected, as herein specified.

2. In railway signaling apparatus, the combination of the insulating-blocks K K′, curved bar L, and straight bar M, the contact-point *s*, contact-screw *t*, and arm *u*, forming an open and closed circuit track-instrument, as specified.

3. In railway signaling apparatus, a color-disk formed of colored gelatine or analogous material inclosed between protecting plates of mica, as herein specified.

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Witnesses:
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