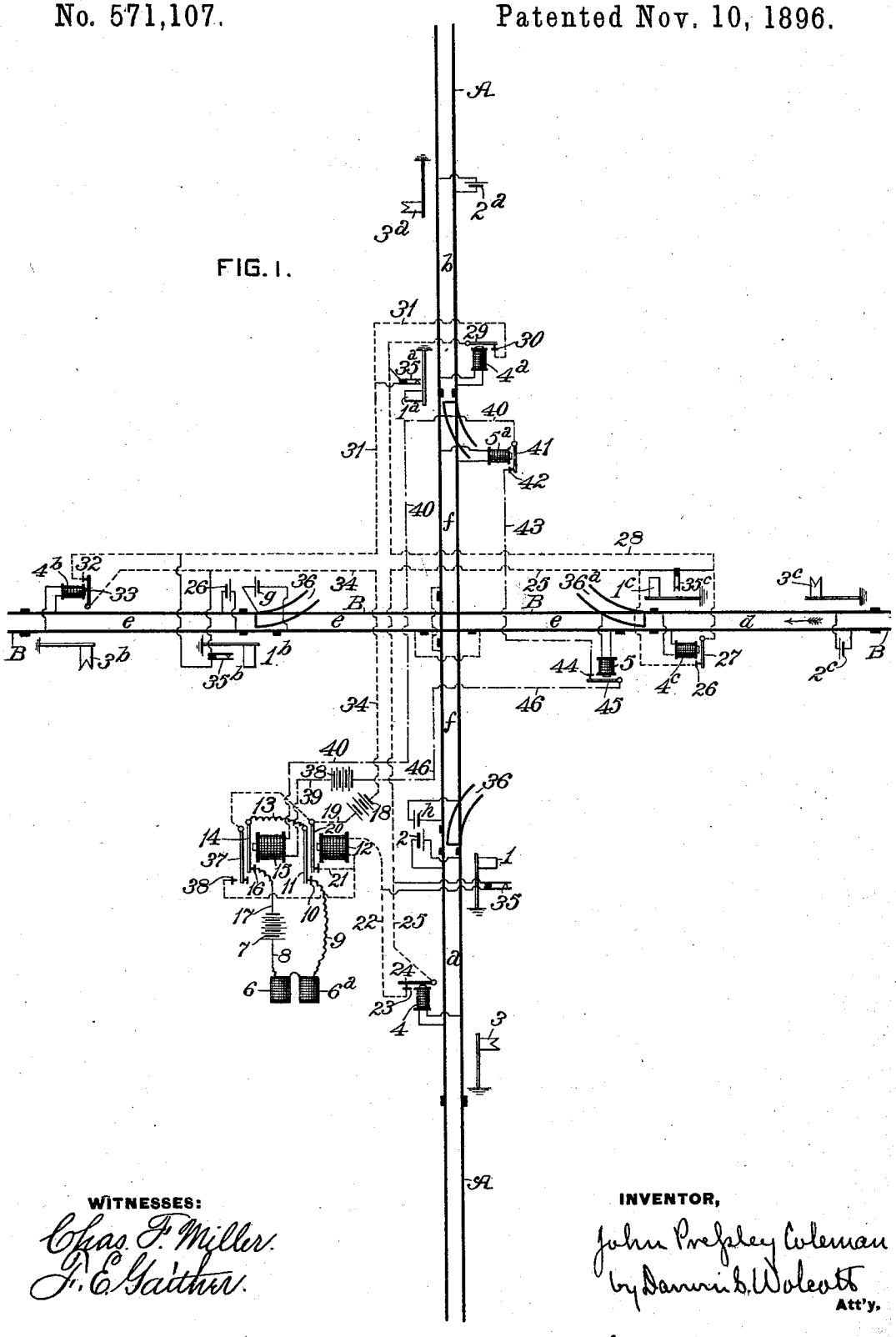
(No Model.) 2 Sheets—Sheet 1.

J. P. COLEMAN.

ELECTRICALLY CONTROLLED DERAILS FOR RAILWAY CROSSINGS.

No. 571,107. Patented Nov. 10, 1896.

FIG. 1.



WITNESSES:

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INVENTOR,

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Att'y.

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FIG. 2.

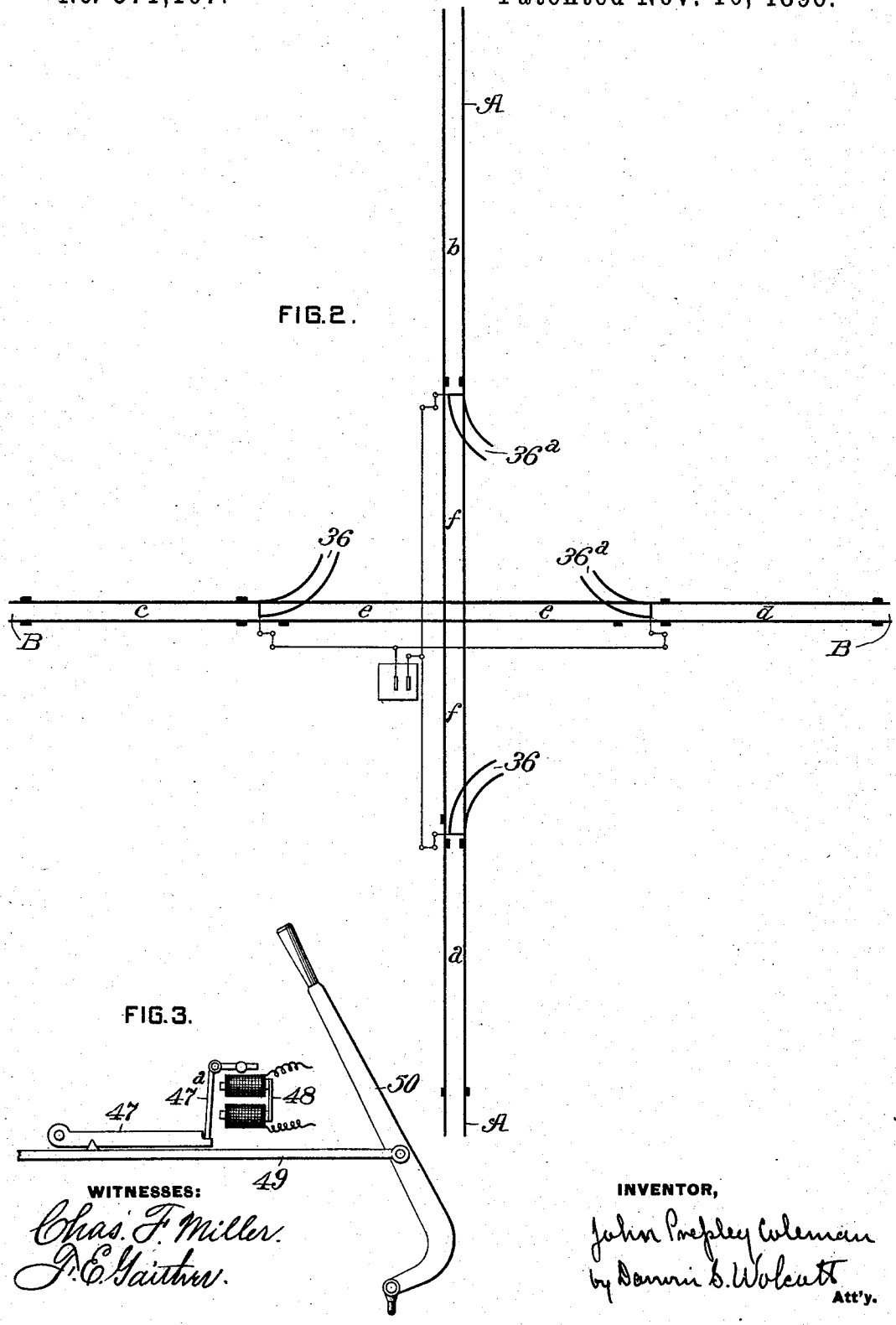

FIG. 3.

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UNITED STATES PATENT OFFICE.

JOHN PRESSLEY COLEMAN, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA.

ELECTRICALLY-CONTROLLED DERAILS FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 571,107, dated November 10, 1896.

Application filed June 1, 1896. Serial No. 593,785. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRESSLEY COLEMAN, a citizen of the United States, residing at Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Electrically-Controlled Derails for Railway-Crossings, of which improvements the following is a specification.

The invention described herein relates to certain improvements in electric locking for the switches and signals of a single-track-railway grade-crossing.

It is customary to provide derailing-switches and home and distant signals controlling the movement of trains in both directions on tracks crossing at grade, the derailing-switches and the several signals being connected by suitable mechanism to operating-levers arranged in the tower at or near the point of crossing of the tracks, and the several levers of the switches and signals in the tower are interlocked, so that the signals of one track cannot be cleared until its derails are at "clear main line," and when the derails of one line are cleared the derails of the other line are locked in normal or open position. When it is desired to permit a train on one of the tracks to proceed over the crossing, the derailing-switch for said track is set to "clear main line," and the movement of the lever for so setting the switch operates through the mechanical interlocking to lock the levers for operating the derailing-switches of the other track at normal or open position and unlocks the home or distant signal of the track to be used. The home signal is next set to "safety," thereby, through the mechanical interlocking in the tower, locking the derail of the track to "clear main line." The distant signal is next set to "safety," thereby locking the home signal at "safety."

The foregoing describes the usual practice, but as it is possible with an apparatus arranged as described for an operator, after the train has passed the distant signal at full speed, as it will have a right to do, to set such signal at "danger," then set the home signal to "danger," and finally throw open the derailing switches before the train has reached the home signal. Under such circumstances it would be impossible for the train to be checked before reaching the derailing-switch, so that the train is liable to be derailed and an accident to occur through the carelessness of the signal-operator.

It is the object of the present invention to prevent any such accidental operation of the derailing-switch. It is not considered good practice to lock the signals at "safety" for the reason that something might occur which would render it desirable to stop a train even after it has passed a distant signal and prevent its proceeding over the crossing. Hence in the practice of my invention I have provided for the locking of the derailing-switches at "clear main line," and the holding of the switches in such locked position after the train has passed the distant signal, while permitting of the free operation of the signals governing such line, so that a train may be stopped from proceeding over a crossing and without any liability of derailing the same. In other words, my improvement permits of the taking away of the signals from a train while maintaining the track over which the train is proceeding in a safe condition until after the train has proceeded over the crossing.

In the accompanying drawings, forming a part of this specification, Figure 1 illustrates diagrammatically a single-track crossing and the several switches and signals with the circuits controlling movements of trains along the tracks. Fig. 2 is a similar view showing the connection from the derails to their operating-levers, and Fig. 3 is a detail view showing a form of electric lock for the operating-levers.

At a suitable distance on each side of the crossing are arranged the home signals 1 1^a and 1^b 1^c, controlling the movement of trains over the tracks A and B. At a suitable distance beyond these home signals are arranged the distant signals 3, 3^a, 3^b, and 3^c. The sections of tracks between the home and distant signals are insulated, and the rails of said tracks form parts of the circuits of the batteries 2^a, 2^b, 2^c, and 2^d. The relays 4 4^a 4^b 4^c are also included in said circuits. Within

the home signals the tracks are insulated from the outer sections and also from each other at the crossing, forming two track-sections *e* and *f*. The section *e* forms part of the circuit of the battery *g*, in whose circuit is included the magnet 5, and the section *f* forms part of the circuit of the battery *h*, in whose circuit is included the magnet 5^a.

To the levers in the tower employed for operating the derail-switches are applied electrically-controlled locks (indicated at 6 6^a) of any suitable form and so constructed as to operate and hold the levers in their shifted position when the circuits controlling the locks are broken. The circuit for the locks consists, starting from battery 7, of wire 8, locks 6 6^a, wire 9, contact-point 10, armature 11 of magnet 12, wire 13, armature 14 of magnet 15, contact-point 16, wire 17, to battery. The circuit of magnet 12 consists, starting from battery 18, of wire 19, armature 20, and contact-point of relay 12, wire 21, relay 12, wire 22, contact-point and armature 23 and 24 of relay 4, wire 25, contact-point and armature 26 and 27 of relay 4^c, wire 28, armature and contact-point 29 and 30 of relay 4^a, wire 31, contact-point and armature 32 and 33 of relay 4^b, wire 34, to battery. Each of the relays 4, 4^a, 4^b, and 4^c is shunted by circuit-breakers 35, 35^a, 35^b, and 35^c, which are closed when the signal is in normal or "danger" position, but are opened when the home signal is shifted to "safety," so that the presence of a train upon any of the track-sections *a*, *b*, *c*, or *d* will not affect the circuit through relay 12 unless the home signal controlling such track-section is at "safety."

In describing the operation of my improved apparatus it will be supposed that a train is to proceed over the crossing along track B in the direction of the arrow *x*. All the derails being in normal condition, the operator shifts the lever connected to derail-switches 36 36^a, thereby shifting said switches to "clear main line," and also locking, through the mechanical interlocking in the tower, the derail-switches 36^a and 36^b to open position, and also locking the home signals 1 1^a and distant signals 3, 3^a, and 3^b to "danger" position. The operator next shifts the home signal 1^c to "safety," thereby locking the lever of derails 36 36^a as against movement and also opening the circuit-breaker 35^c in the main lock-circuit. The distant signal 3^c is next cleared, thereby locking the home signal 1^c to "danger." A train is now free to pass along track B over the crossing. As a train enters upon track-section *d* relay 4^c is short-circuited, thereby breaking the main locking-circuit through magnet 12 at the make-and-break mechanism, consisting of armature 27 and contact-point 26.

The breaking of the circuit through magnet 12 breaks the circuit through the locks 6 6^a of the levers for operating the derail-switches at the make-and-break mechanism, consisting of the armature 11 and contact-point 10, thereby locking the levers of the derail-switches as against any movement regardless of the position of the home-signal lever. As the locking of these derail-levers does not affect the levers operating the signals 1^c and 3^c said signals may be thrown to "danger" and hold a train upon track-section *d* or upon track-section *e*. The movement of home signal 1^c to "danger" will close the shunting circuit-breaker 35^c, and thereby close the circuit through magnet 12, but this will not affect the circuit through the derail-locks 6 6^a, for the reason that the circuit in which the circuit-breaker 35^c is included cannot be restored until after the magnet 12 is reënergized, and this can only be effected by the completion of the shunt-circuit including armature 37 and back-stop 38 of magnet 15. The completion of this shunt-circuit through magnet 12 is dependent upon the deënergizing of magnet 15, whose circuit consists, starting from battery 38, of wire 39, magnet 15, wire 40, armature and contact-point 41 and 42 of relay 5^a, wire 43, contact-point and armature 44 and 45 of relay 5, wire 46, to battery. Magnet 15 will thus be deënergized by the entrance of a train upon track-section *e*, thereby cutting out magnet 5 and opening the circuit of magnet 15 at the make-and-break mechanism, consisting of armature 45 and contact-point 44. Simultaneous with the completion of the shunt-circuit of magnet 12 by the deënergization of magnet 15 the circuit, through locks 6 and 6^a, is broken by the movement of armature 14 and magnet 15 away from its contact-point 16, thereby forming another break in the lock-circuit simultaneous with the closing of the make-and-break mechanism 10 and 11, due to the energizing of magnet 12. Magnet 15 will be maintained in its deënergized state until after a train has proceeded over the crossing and beyond the home signal 1^b. As soon as the train leaves track-section *e* the make-and-break mechanism 44 and 45 will be restored, magnet 15 reënergized, and the break in the locks 6 and 6^a will be closed, thereby unlocking the derail-levers and permitting their restoration to normal position.

From the foregoing it will be seen that while the several signals controlling track B may be shifted freely to and from "danger" position, the condition of the track, it having once been placed in condition for the passage of a train over the crossing, cannot, after the train has entered upon the track-section controlled by the distant signal, be in any way changed except by the train proceeding over the crossing and beyond the home signal on the opposite side of the crossing, whereby the derailing-switches are unlocked.

The make-and-break mechanisms 35 35^a, &c., serve to hold the controlling-circuit closed in case a train should accidentally enter one of the track-sections *a*, *b*, or *c* and thereby short-circuit the relays 4, 4^a, and 4^b

and open the make-and-break mechanisms operated by said relays in the controlling-circuit. The result of the presence of a train on either of the track-sections, and consequent opening of the controlling-circuit while the derail switches are open or normal, would be to lock the switch-operating levers in normal position and hold them until the train backed off or the circuit otherwise closed. Such accidental locking of the levers is prevented by the shunt make-and-break mechanisms 35 35ª, &c., which hold the circuit closed while the home signals are at danger, regardless of the presence of a train on the track-sections *a b*, &c.

Any suitable form of electric lock for the levers may be used, such, for example, as that shown in Fig. 3, consisting of a pivoted latch 47 and catch 47ª, having its free end connected to the armature of the magnet 48 and provided with a notch for the reception of a projection on the rod 49, which is connected to the lever 50.

I claim herein as my invention—

1. The combination of two intersecting tracks, derail-switches arranged in said tracks on opposite sides of their intersection, levers for operating said switches, electrically-controlled locks for said levers, make-and-break mechanisms included in the circuit controlling said locks and located at points outside the derail-switches, an auxiliary lock-controlling circuit, and make-and-break mechanisms included in said circuits and located inside the derail-switches, the make-and-break mechanisms in the main and auxiliary circuits being adapted to be operated by the passage of trains along the tracks, substantially as set forth.

2. The combination of two intersecting tracks, signals controlling the movement of trains along said tracks, derail-switches arranged in said tracks on opposite sides of their intersection, levers for operating said switches, electrically-controlled locks for said levers, a circuit for controlling said locks, make-and-break mechanisms operated by the passage of a train and arranged in said circuit outside of the derail-switches, make-and-break mechanisms controlled by the signals and adapted, when closed, to shunt the make-and-break mechanisms operated by the train, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN PRESSLEY COLEMAN.

Witnesses:
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M. S. MURPHY.