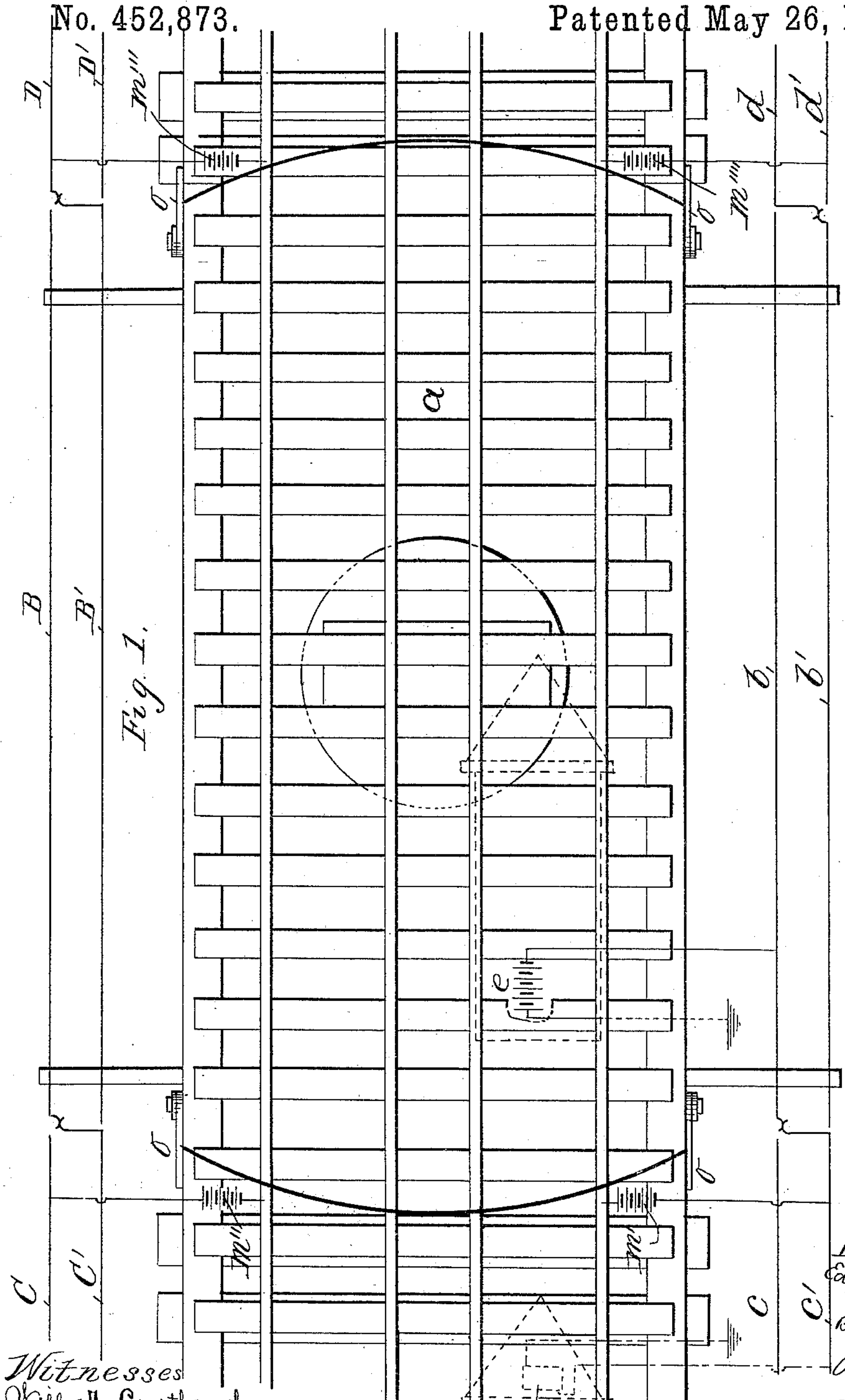
(No Model.)

9 Sheets—Sheet 1.

E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

No. 452,873. Patented May 26, 1891.



Witnesses
Will A. Courtland
Nellie L. Pope

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

(No Model.) 9 Sheets—Sheet 2.

E. DEMING.

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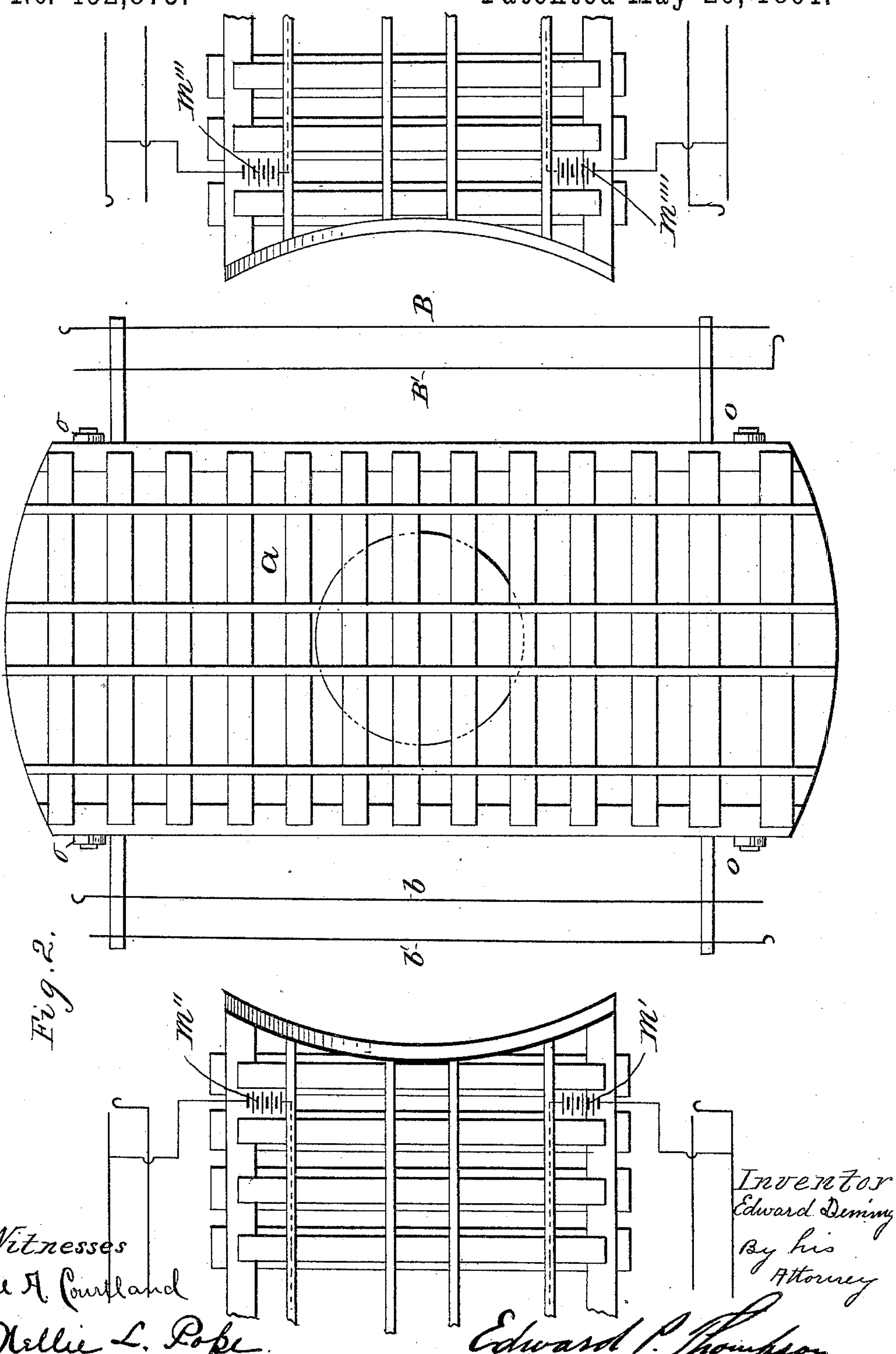

Fig. 2.

Witnesses
Alex A. Courtland
Nellie L. Pope

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

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E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

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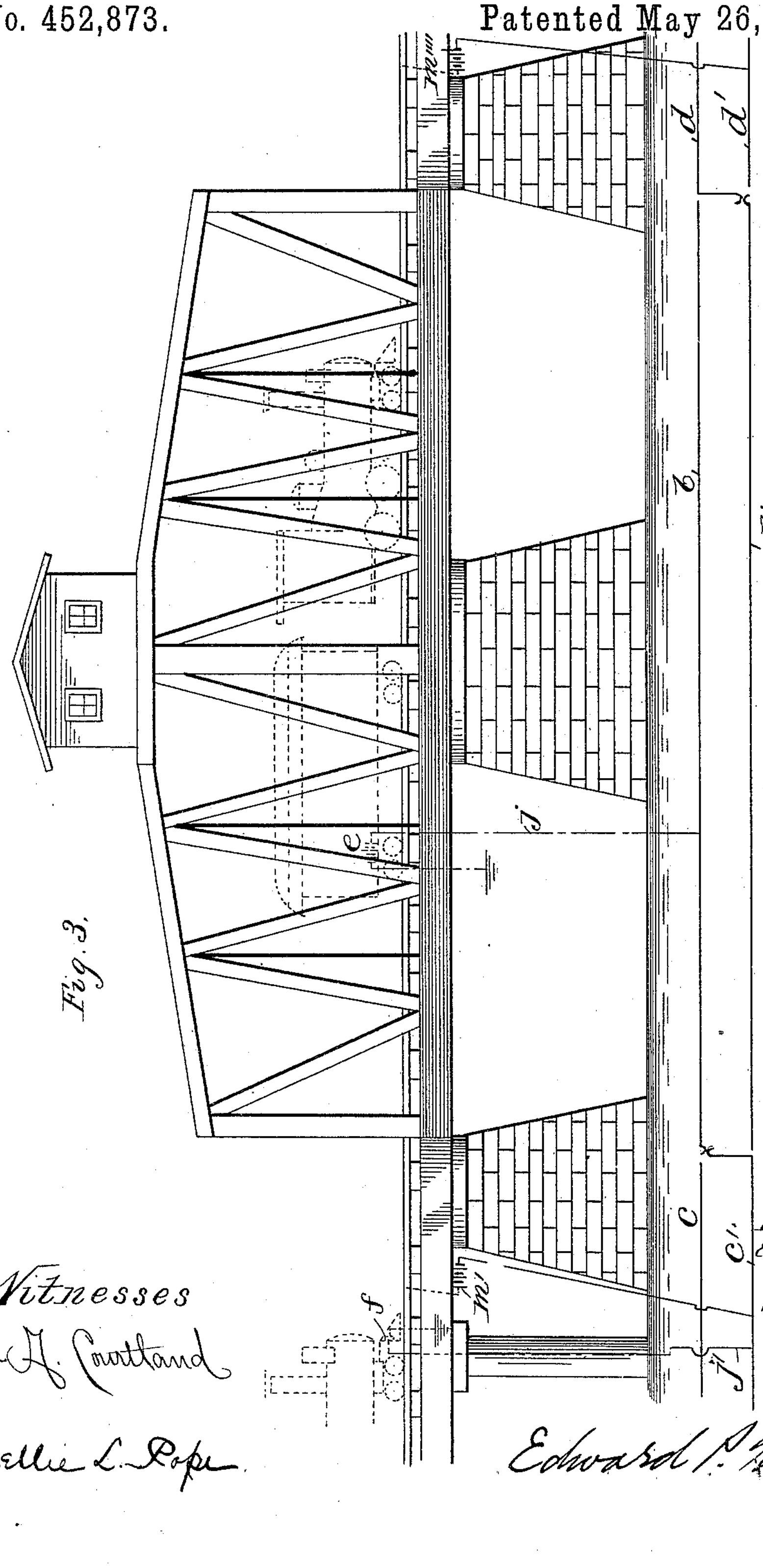

Fig. 3.

Witnesses
Will J. Courtland
Nellie L. Pope

Inventor.
Edward Deming
By his Attorney
Edward P. Thompson

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E. DEMING.

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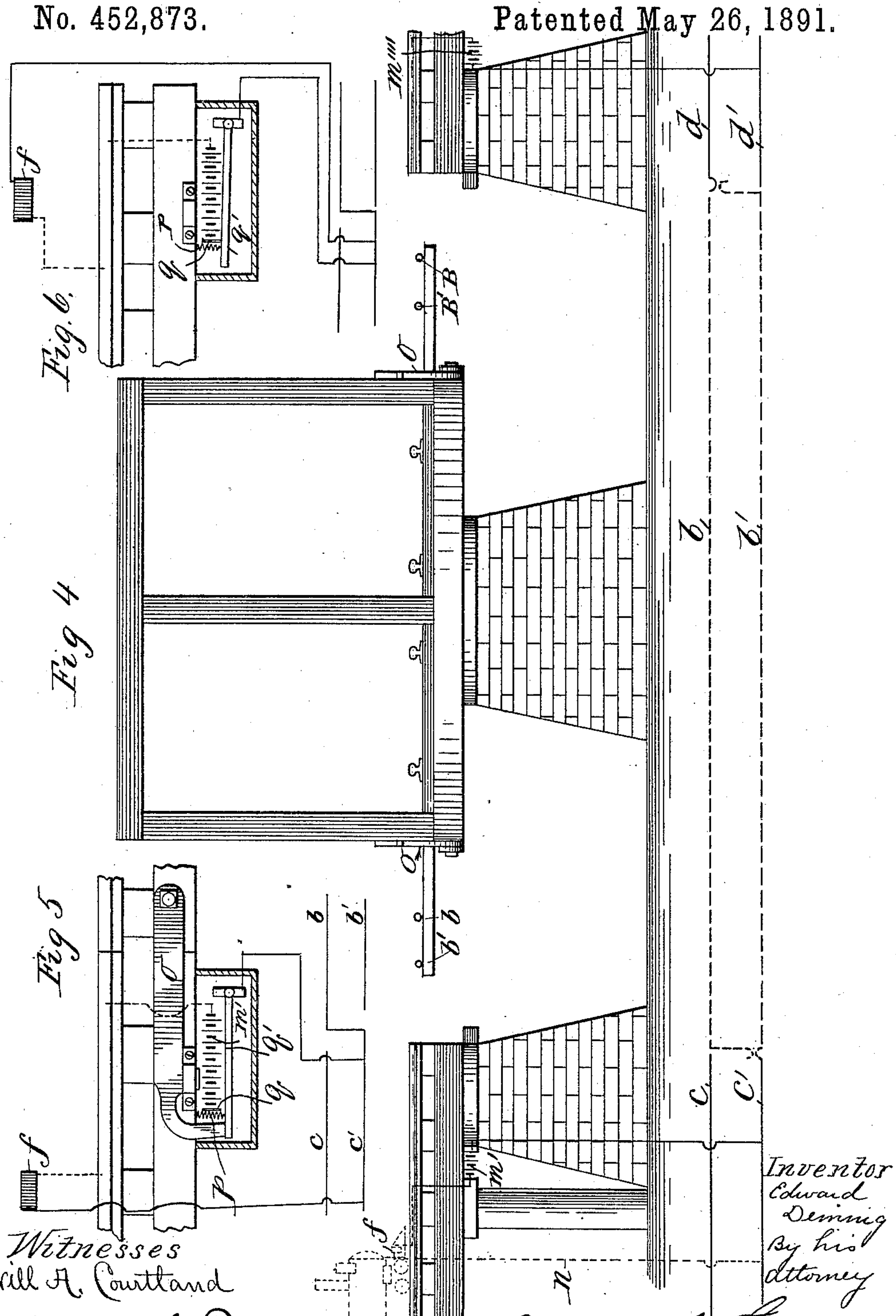

Witnesses
Will A. Courtland
Nellie L. Pope

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

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E. DEMING.

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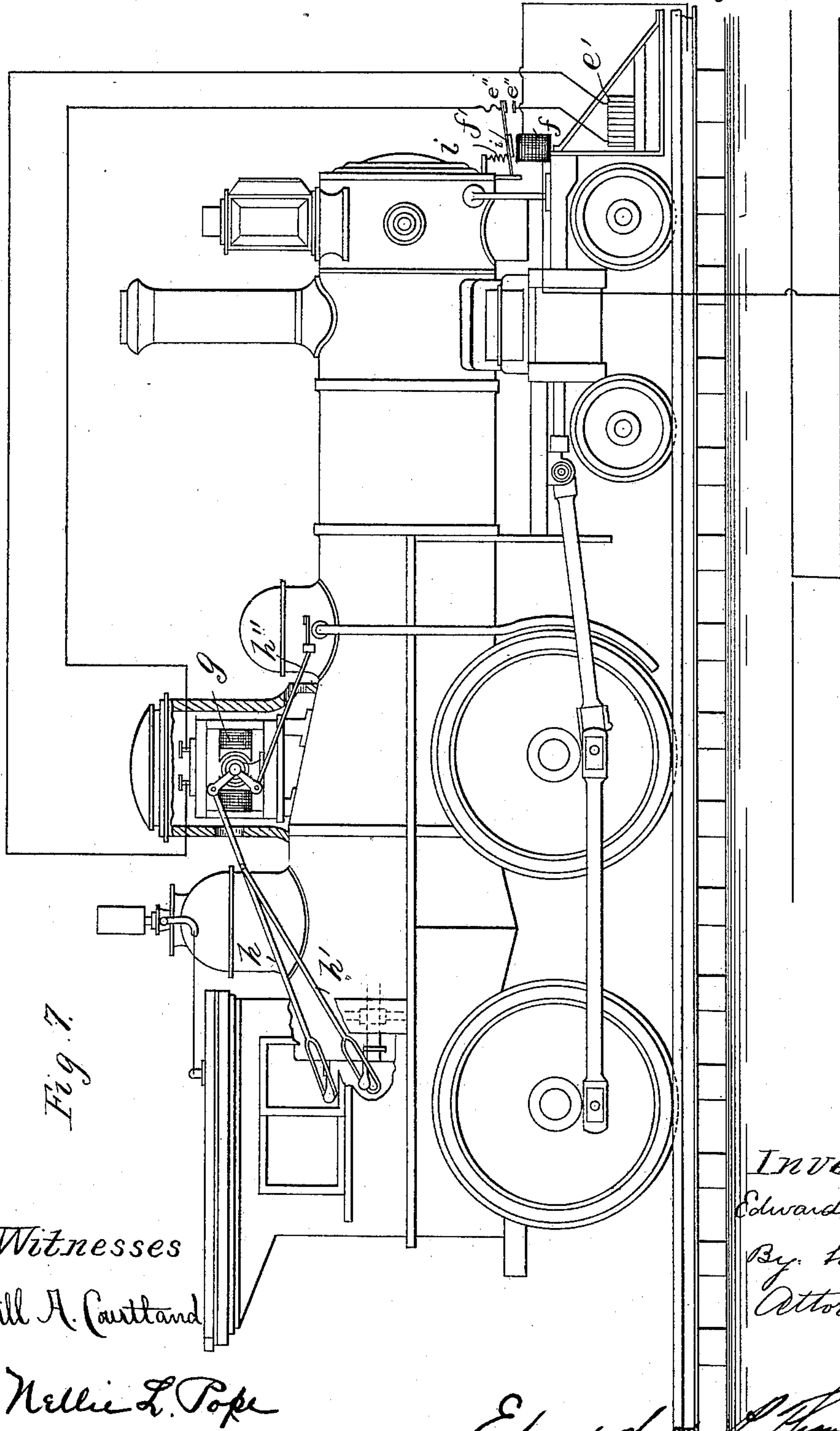

Fig. 7.

Witnesses
Will A. Courtland
Nellie L. Pope

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

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E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

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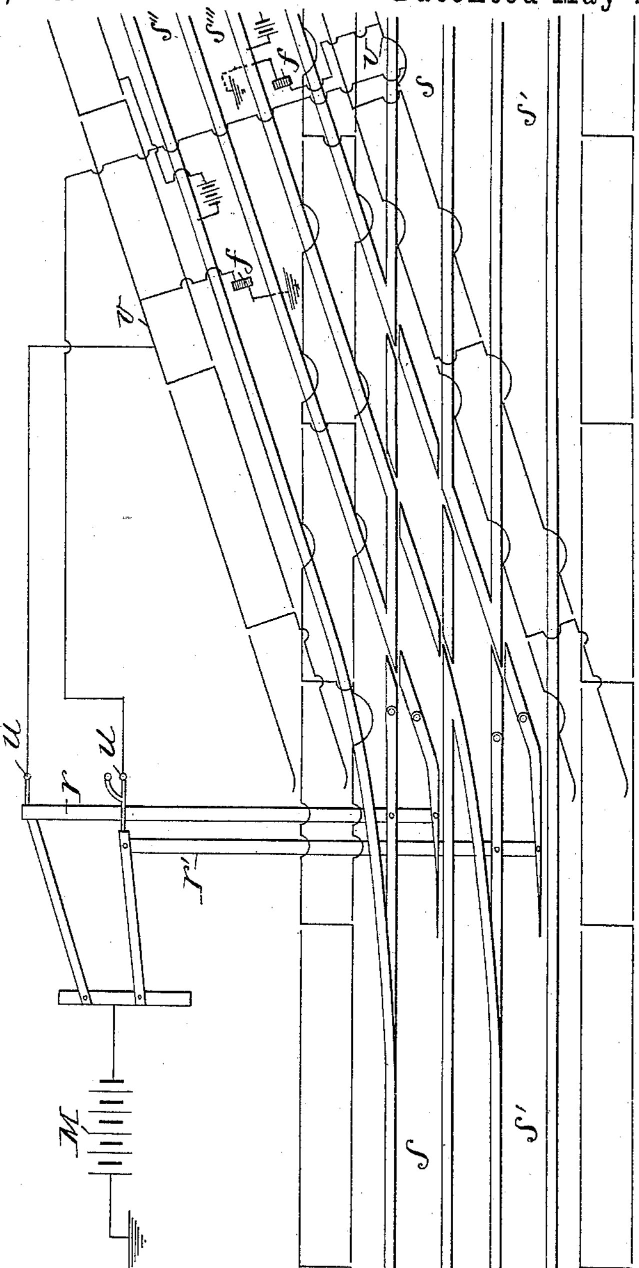
Fig. 8.



Witnesses
W. A. Courtland
Nellie L. Pope

Inventor
Edward Deming
By his attorney
Edward P. Thompson

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E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

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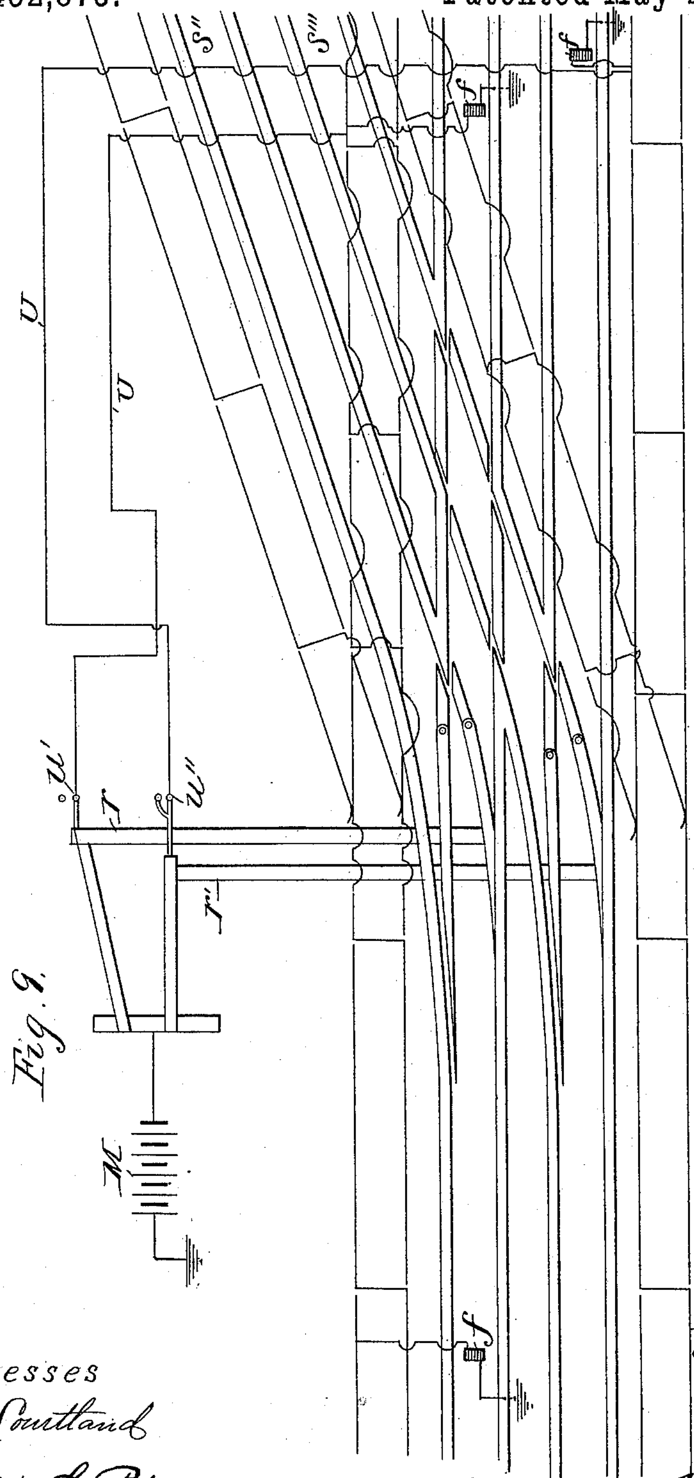

Witnesses
W. A. Courtland
Nellie L. Pope.

Inventor
Edward Deming
By his attorney
Edward P. Thompson

(No Model.) 9 Sheets—Sheet 8.

E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

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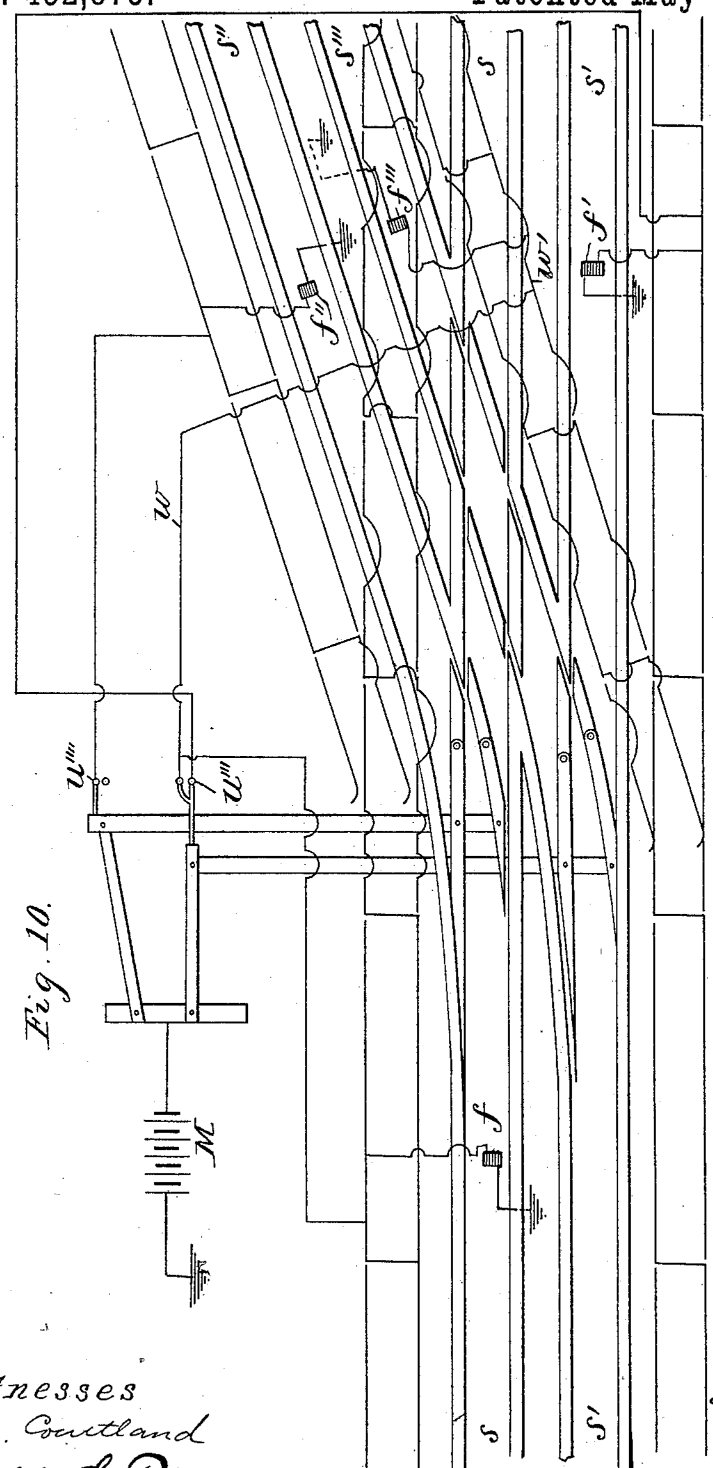

Fig. 10.

Witnesses
W. A. Courtland
Nellie L. Pope.

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

(No Model.)

E. DEMING.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY SWITCHES AND DRAW BRIDGES.

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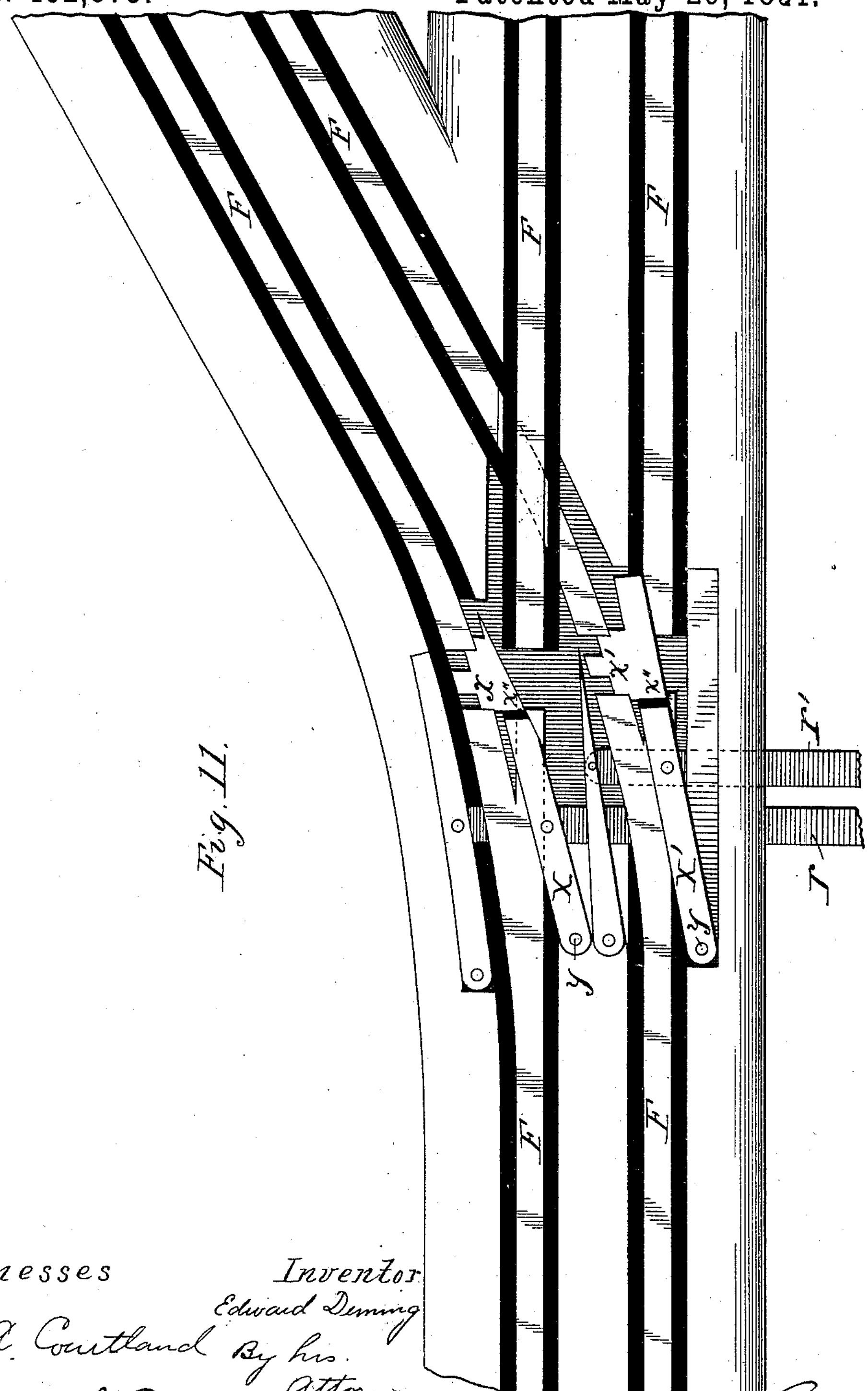

Fig. 11.

Witnesses
W. A. Courtland
Nellie L. Pope.

Inventor
Edward Deming
By his Attorney
Edward P. Thompson

UNITED STATES PATENT OFFICE.

EDWARD DEMING, OF BROOKLYN, ASSIGNOR OF TWO-THIRDS TO ADOLPH KAUFMANN AND ISAAC STERN, OF NEW YORK, N. Y.

AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY-SWITCHES AND DRAW-BRIDGES.

SPECIFICATION forming part of Letters Patent No. 452,873, dated May 26, 1891.

Application filed September 22, 1890. Serial No. 365,701. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DEMING, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Automatic Electric Safety Systems for Railway-Switches and Draw-Bridges, (Case 4,) of which the following is a specification.

My invention relates to an electric system adapted to prevent trains from injury at draw-bridges and railway-switches.

The object of the invention is to provide a system whereby the train shall be automatically stopped when arriving within a predetermined distance of an open draw-bridge or open railway-switch.

The system is described by reference to the accompanying drawings.

Figure 1 is a plan of a closed draw-bridge equipped with my invention. A train approaching a closed draw-bridge will not be automatically stopped unless there happens to be another train coming or standing on the same track. Such a condition is illustrated, the train on the bridge carrying an electric generator which is on every train and has one pole connected to the ground through the car wheels and rails and the other to a trolley resting upon a sectional conductor. Fig. 2 is a plan similar to Fig. 1, except that the bridge is open and the circuits are changed accordingly, as hereinafter explained; also, no train is supposed to be on the bridge nor approaching the same within a dangerous distance. The figure is contracted in one direction. Fig. 3 is an elevation of the system and conditions shown in Fig. 1. Fig. 4 is an elevation of the system and conditions shown in Fig. 2, except that a train is shown within a predetermined distance of the open bridge, and the circuits are shown in the proper conditions for stopping the train before arriving at the bridge. Figs. 5 and 6 show the means for controlling the circuit according to the opening or closing of the bridge, the former figure showing the condition where the bridge is closed and the circuit open and the latter the opposite conditions. Fig. 7 shows the equipment of the locomotive and a portion of the locomotive itself in elevation. It is provided with a magnet which serves to throw a battery in circuit with an electric motor, as hereinafter described. Figs. 8, 9, and 10 are plans of a railway-switch equipped with the system, the figures showing a double track. Fig. 8 shows the condition of the branch road closed to the main or straight track, the main track being continuous. It shows how trains will be stopped while approaching the switch on the branch track. Fig. 9 shows the condition where trains coming from one direction may pass upon the branch track from the main track or from the branch upon the main track with safety, but where trains approaching in the opposite direction on the main track will be stopped automatically. In all these Figs. 8, 9, and 10 the locomotive is not shown; but the magnet carried by the locomotive is shown, and is sufficient to be able to follow the circuits. Fig. 10 shows one main track open and one closed. Fig. 11 shows the electric conduit and means for electrically opening and closing the same at a railway-switch.

The equipment of the draw-bridge is first described, and consists, in combination with the bridge, of a pivoted bridge a, carrying an insulator A, electric conductors b and b', which are sections of electrical conductors running the whole length of the track, as shown by sections c and c' and d and d' at each end of the bridge. Each track is provided with such sectional conductors and are lettered correspondingly, as B and B′, C and C′, and D and D′. The rear car of each train carries an electric generator e, as seen in Fig. 3. Each locomotive carries a magnet f, which acts as a relay-magnet to introduce a local circuit from battery e' in electrical connection with a motor g, which is geared by rods h, h', and h'', respectively, to the handles of the throttle-valve, automatic brake, and sand-distributer in such a manner, as by cranks, that when the motor-shaft rotates the said handles will be operated as if by the engineer and the train will be stopped automatically. The magnet f has an armature f', which when attracted closes the local circuit by bringing the terminals e'' together. When the current through the magnet f is open, the retractile spring i opens the local circuit by pulling the contacts apart. It is evident, then, that when the magnet *f* is energized the train will stop, so that it will be convenient hereinafter to refer to the magnet and not each time show how it is the relay for stopping the train. One pole of the battery *e* being connected through the wheels to the track and thence to the ground and the other having a sliding or rolling contact upon a sectional conductor *b*, and the train carrying the battery *e* being on the draw, and the poles of the magnet *f* being connected, similarly to those of the battery *e*, to the ground and sectional conductor *c'*, then a circuit will be closed from the battery *e* through the magnet *f* on the locomotive, and the train will be stopped before reaching the bridge containing another train.

It should be stated that the conductors *c b d* are all in such a position that the wire *j* from the battery will slide along them, and that the conductors *c'*, *b'*, and *d'* are in a line for allowing the conductor *j'* from the magnet *f* to slide along them; also, that conductor *c'* is electrically connected to conductor *b*, and *b'* to *d*, while conductors *c* and *b* are insulated from each other, and also *b* and *d*, as well as *c'* and *b'* and *b'* and *d'*. When the draw-bridge is open, however, means are provided whereby conductor *c'* will be cut off from conductor *b* and conductor *b'* from conductor *d*.

A battery is located at the end of each track before it passes upon the bridge, there being four such batteries *m'*, *m''*, *m'''*, and *m''''*. One pole of each battery is connected to the ground permanently. The opposite pole in each case is connected with that sectional conductor upon which rests the terminal of the magnet *f* when the train comes toward the bridge within the length of said section. In Fig. 4 it connects with the sectional conductor *c'*, upon which rests the conductor *n*, extending from the magnet *f*. A closed circuit is formed, therefore, through the magnet *f* as soon as the train arrives at the bridge within the distance of the length of the sectional conductor *c'*, which in practice would be about a quarter of a mile. The explanation would be similar if a train arrived on any one of the remaining three tracks from either direction, or even if the train were backing, instead of traveling with the engine headed toward the bridge. When the bridge is opened, the operator raises the levers *o* at each end of the bridge, while springs *p*, attached to circuit-closers *q'*, pull the latter closed at the contacts *q*. *q* is one terminal of the battery *m'* in Fig. 5. It is out of contact with the terminal *q'*, which is electrically connected with the magnet *f*. When the switch *o* is raised, the spring *p* causes these two contacts *q* and *q'* to come together, completing a circuit from the battery *m'* through the magnet *f* when the latter is within a predetermined distance of the draw-bridge. The two contacts *q* and *q'* are shown touching each other in Fig. 6.

Referring particularly to Figs. 8, 9, and 10, there is represented a railway-switch *r* and *r'* for each track, so that trains running from the left to the right may either continue on the main tracks *s* and *s'* or turn upon the branch tracks *s''* and *s'''*. At or near the switch is an electrical generator M, having one pole connected permanently to ground. The other pole is connected to terminals upon the switches *r* and *r'*. In Fig. 8, *f*, as before, represents the magnets upon the locomotives. When they come upon one of the sections near the switch, the current from battery M passes through them because the contacts *u* on the switches close the circuits through said sections and said magnets. The sections *v* of the respective tracks are connected to the contact-points *u*, but when the switches are moved so as to make the branch tracks continuous with the main tracks the contacts *u* open the battery-circuits to the sections *v*. Consequently when the branch track is continuous with the main track trains on the former will not be stopped, and when cut off they will be automatically stopped.

My system is also applicable to the case where trains may be coming from the right on the main track and be stopped or not stopped, according as to whether the main track is cut off from or continuous with itself. This case is shown in Fig. 9. Contacts *u'* and *u''* are carried, respectively, by the switches *r* and *r'*, and are connected electrically to the magnets *f* of trains which are coming from the right on the main track. The conductors thus making the electrical connections are lettered U. If only one main track is continuous and the other interrupted, then a magnet *f'*, Fig. 10, approaching on the interrupted track from the right will come into circuit with the battery M and the train carrying said magnet will be stopped; also will the magnet *f''* on the interrupted branch track *s''* be put into a closed circuit with the battery M; but the magnet *f'''* will not be put into a closed circuit, because in that position the contact *u'''* is not closed with any section along that track *s''*; but if the switch is moved so as to make the track *s'''* continuous with the track *s'*, then the contact *u'''* will come upon the conductor *w*, which is connected to a sectional conductor *w'* belonging to the said track *s'''*.

No one figure represents all the contacts *u*, *u'*, *u''*, *u'''*, and *u''''*, as the circuits might be so confusing as to be unintelligible.

The contact from the magnets *f*, *f'*, and *f''* to the sectional conductors *v w'*, &c., is made in a conduit, which should be provided with an electric circuit-closer at each railway-switch. Such circuit-closers *x* and *x'* are shown in Fig 11, which represents a portion of a double conduit. The switches are *r* and *r'*, as before. To these are attached the circuit-closer handles or levers X and X', pivoted to the stationary points *y*. The circuit-closers *x* and *x'* are insulated by insulation *x''* from the levers X and X'. The conductors of the conduit are F, and each is surrounded, except on the top, by insulation. These conductors are broken at the circuit-closers, which, if closed, mend the break, so as to form one continuous conductor. When the bridge is closed, the circuit from magnet *f*, Figs. 1 and 5, is to section C', to battery *m*, open from there to the contact *q*, to the rail B, and then through the rail to the other terminal of the magnet *f*. In Fig. 6, the bridge being open, the circuit is the same, except that it is closed by the contact *q* touching the lever *q'*.

I claim as my invention—

1. In an electric safety system for railway-trains, the combination of a locomotive provided with an electric motor engaged with the handles of the throttle-valve, automatic brake, and sand-distributer, an electric generator upon said locomotive in circuit with said motor, said circuit being normally open, an electro-magnet whose armature is a circuit-closer to said generator, electrical conductors connecting said magnet respectively to the ground and to a sectional conductor within a predetermined distance from a draw-bridge or railway-switch, an electric generator permanently located at or near the draw-bridge or switch and having one pole grounded and the other connected permanently to said sectional conductor, and an electric circuit-closer for said last-named generator attached to said railway-switch or draw-bridge, all combined substantially as and for the purpose described.

2. In an electric safety system for railway-trains, the combination, with an electric motor engaged with the throttle-valve, automatic brake, and sand-distributer, of a stationary electric-battery circuit controlled by a draw-bridge or railway-switch, including an electro-magnet which is provided with an armature circuit-closer in circuit with an independent electric generator in circuit with said motor.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of September, 1890.

EDWARD DEMING.

Witnesses:
E. G. DUVALL, Jr.
EDWARD P. THOMPSON.