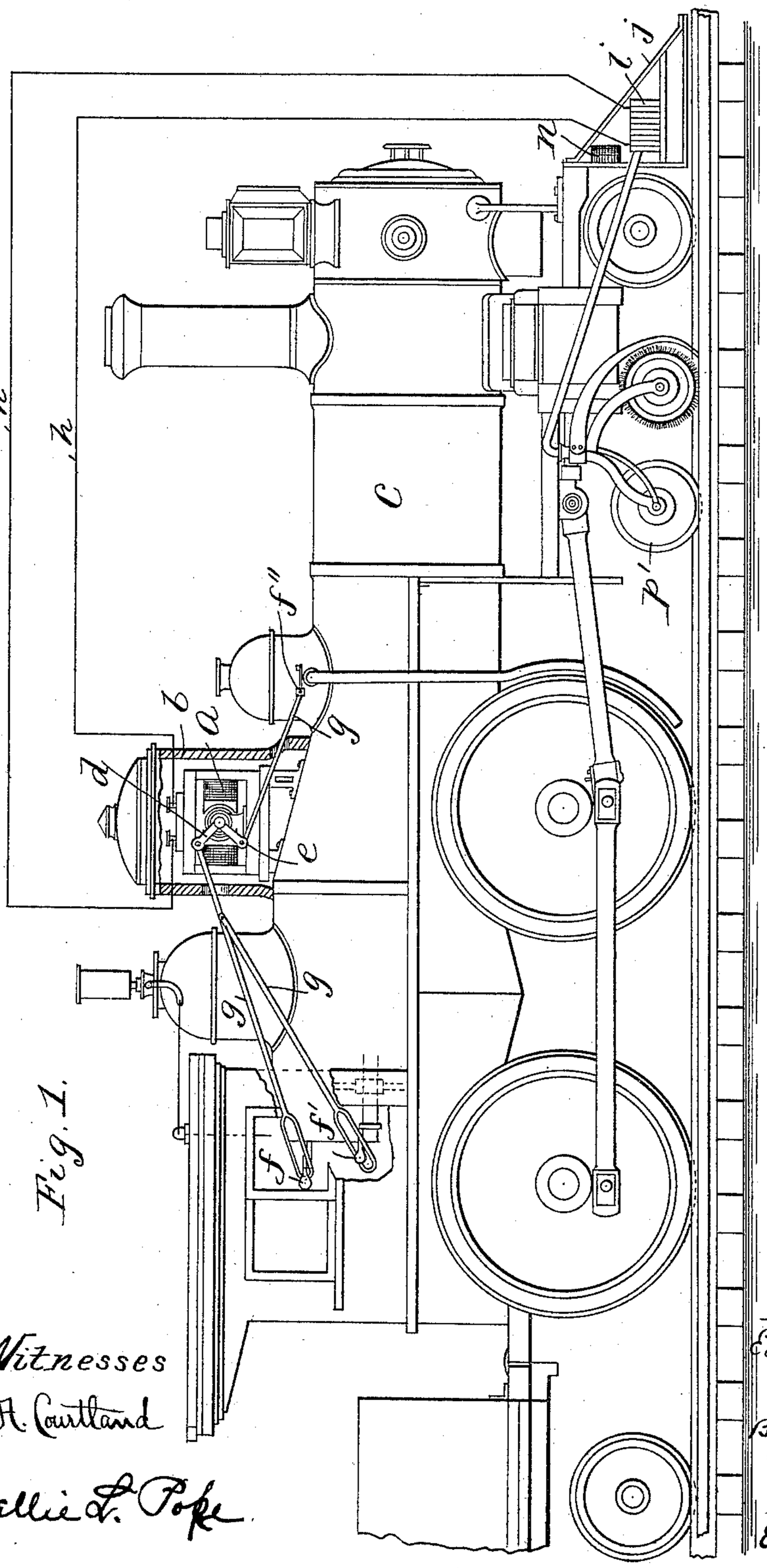
(No Model.) 4 Sheets—Sheet 1.

# E. DEMING.

## AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY CROSSINGS.

No. 452,874. Patented May 26, 1891.

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Nellie L. Poke.

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(No Model.) 4 Sheets—Sheet 2.

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## AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY CROSSINGS.

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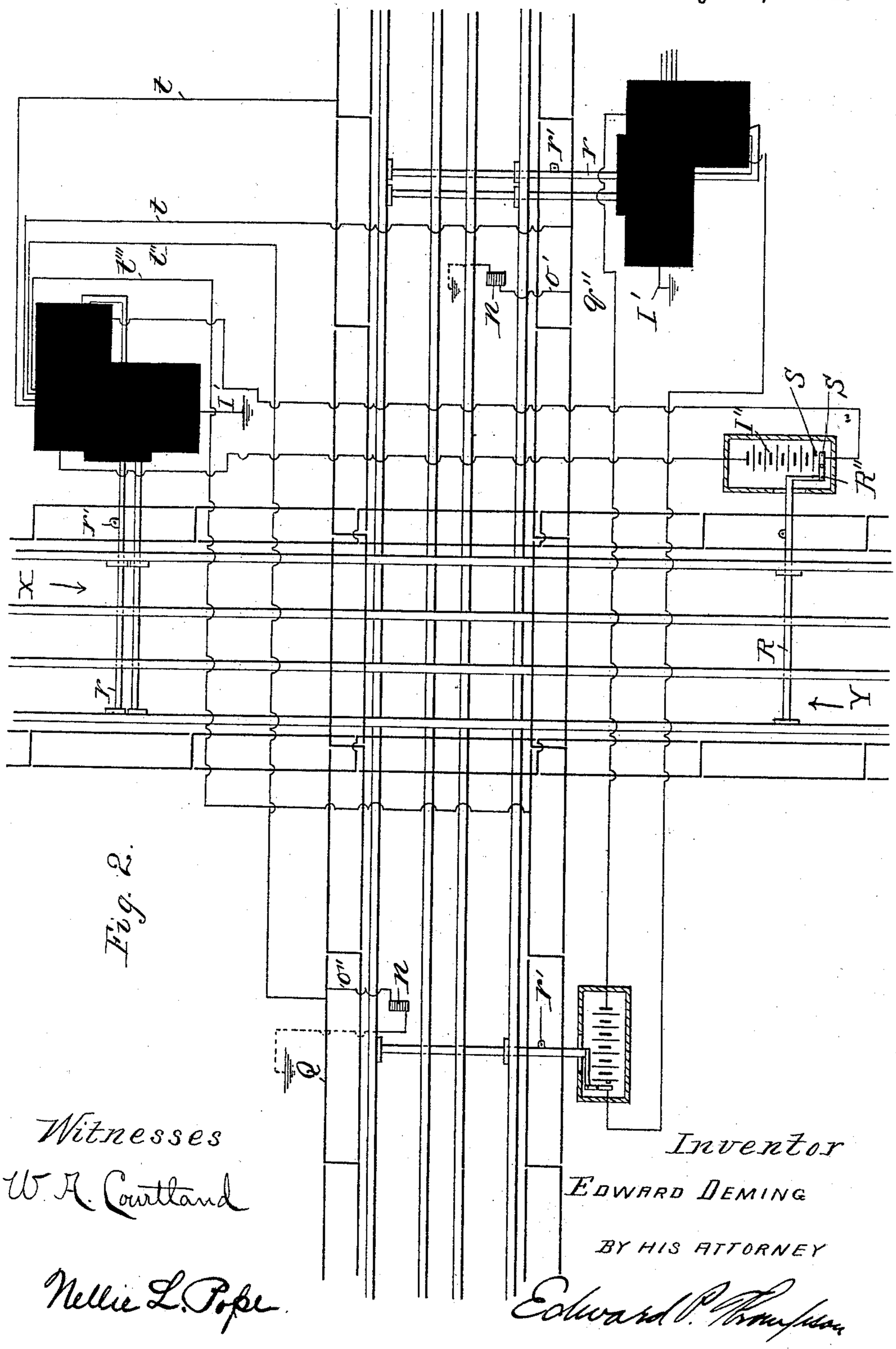


Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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## AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY CROSSINGS.

No. 452,874. Patented May 26, 1891.

Fig. 3.

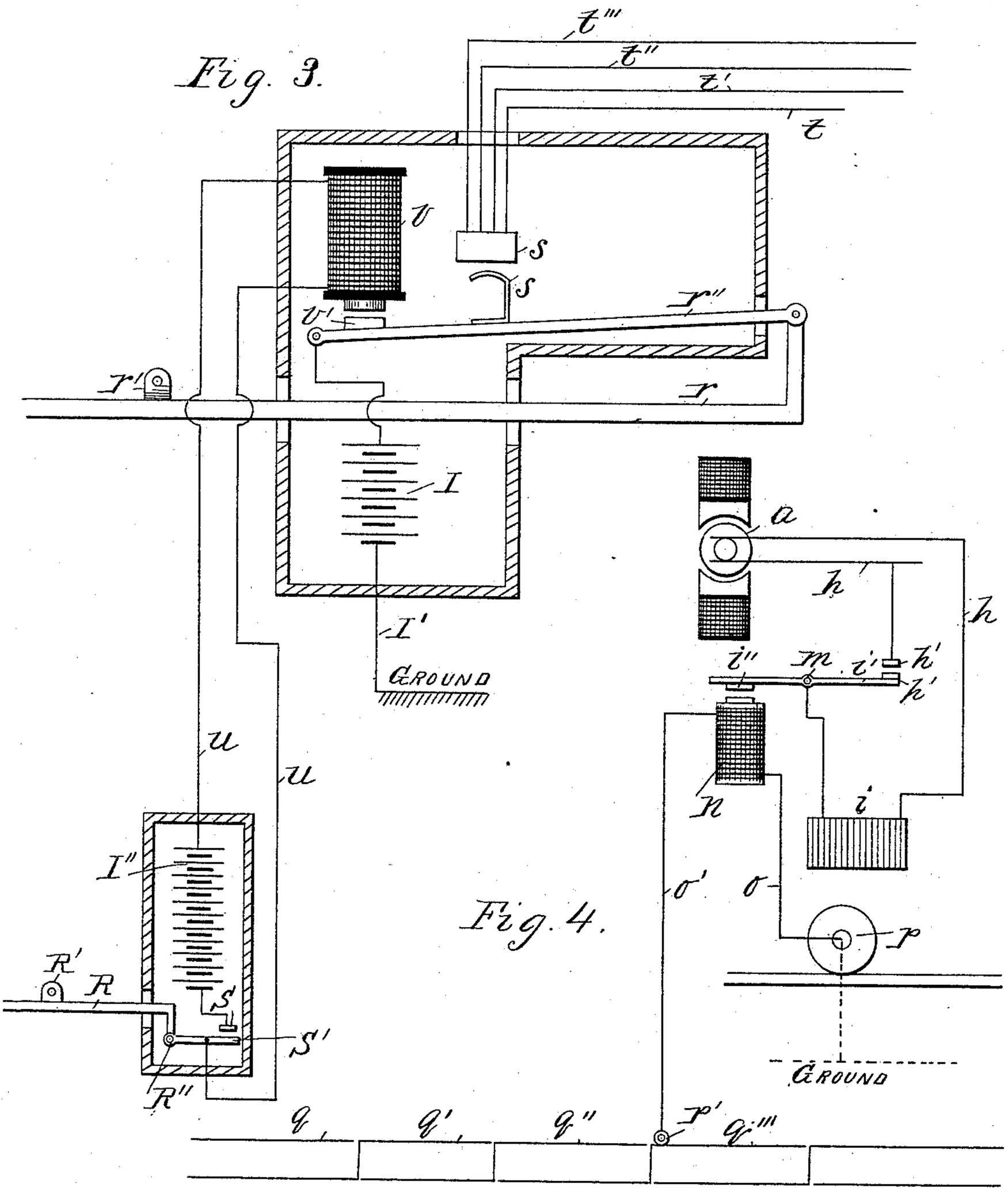


Fig. 4.

Witnesses

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(No Model.) 4 Sheets—Sheet 4.

# E. DEMING.

## AUTOMATIC ELECTRIC SAFETY SYSTEM FOR RAILWAY CROSSINGS.

No. 452,874. Patented May 26, 1891.

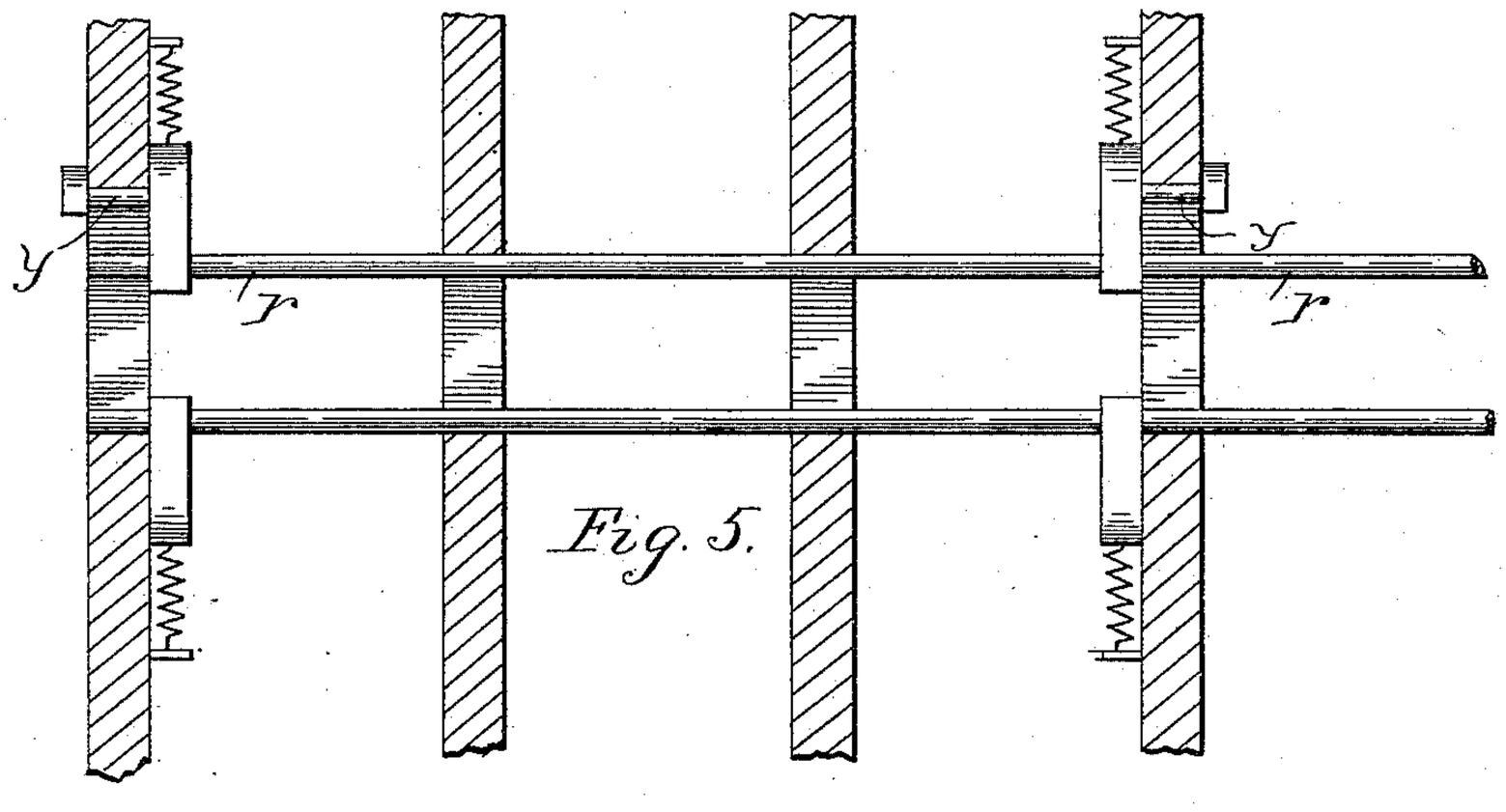


Fig. 5.

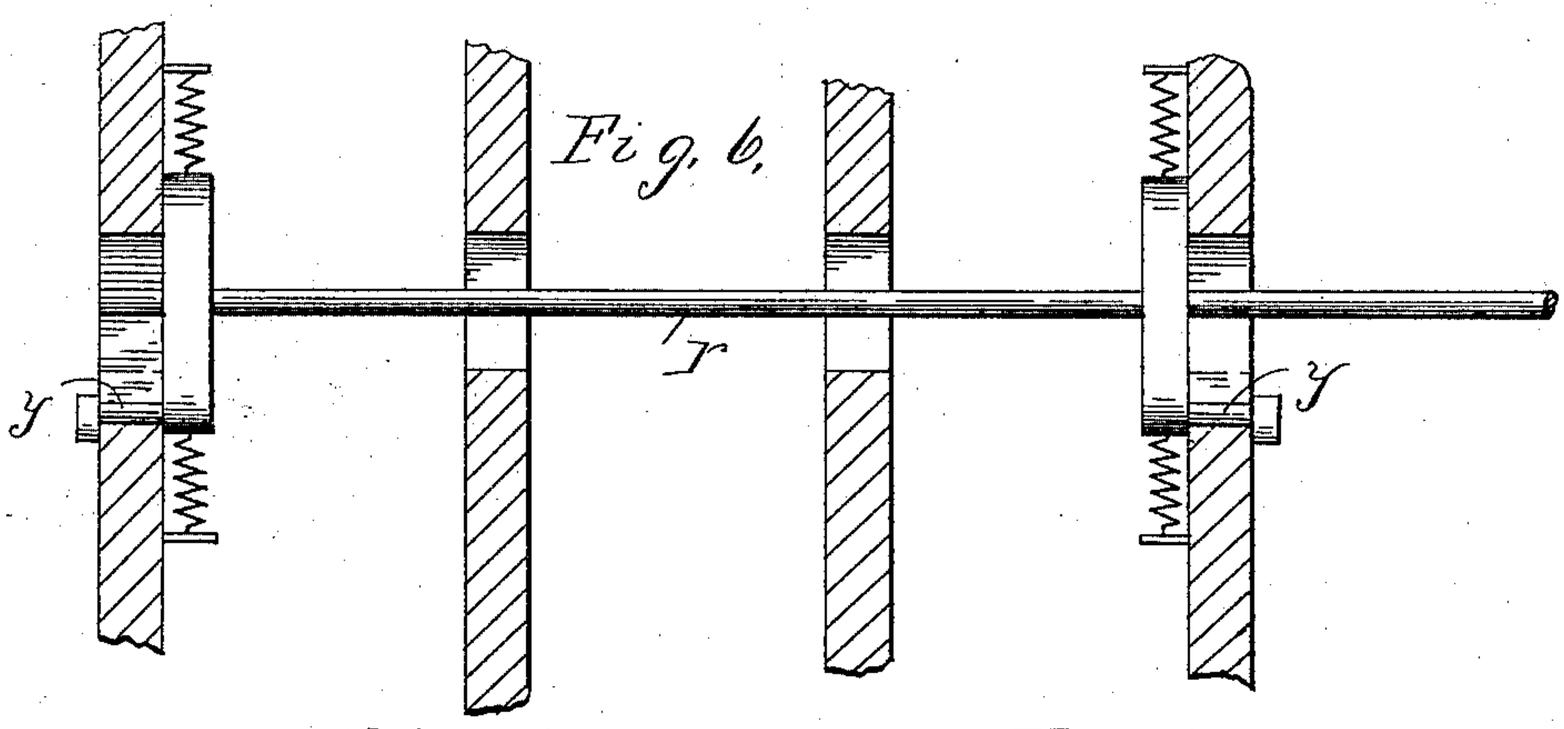


Fig. 6.

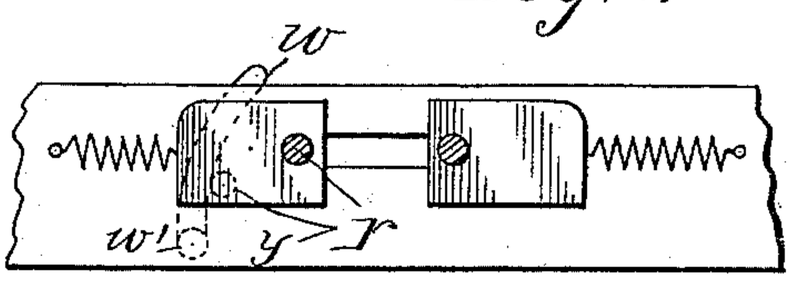


Fig. 7.

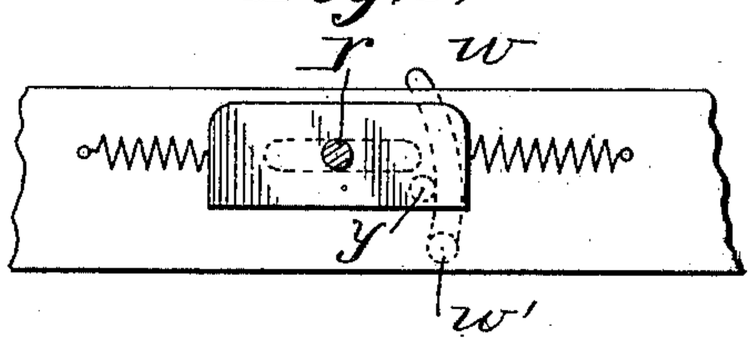


Fig. 8.

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-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 452,874, dated May 26, 1891.

Application filed September 24, 1890. Serial No. 365,985. (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-Crossings, of which the following is a specification.

My invention relates to an electric safety system for railway-crossings where one railway passes over a second railway.

The object of the invention is to provide a system in which a train will be automatically stopped within a predetermined distance of the crossing when another train is at or near the crossing on another track.

The invention is applicable to a double track crossing a double track.

The invention in all its details is represented in the accompanying drawings.

Figure 1 is a side elevation of a locomotive equipped with the invention as far as the limits of the locomotive are concerned. Fig. 2 is a plan, partly in diagram, of two double-track railways crossing each other equipped with the invention. The mechanism for operating the circuit-closers of certain batteries is not visible in this figure, as it could not be represented clearly on such a small scale, but is shown as to location by the black boxes. The mechanism itself, with a portion of the conductors and circuits, is shown in Fig. 3, which illustrates how a battery on the ground may be put in circuit with an electro-magnetic device on the locomotive. Fig. 4 is a view, partly in diagram, of the electrical connection between the locomotive and the rest of the system. Figs. 5 and 6 are horizontal sections of a portion of the tracks and of the levers by which the locomotive may operate certain circuit-closers. Figs. 7 and 8 are views of the side of a portion of the rails, showing the cams which come in direct contact with the locomotive-wheels if the train is going forward, or car-wheels if the train is backing.

Referring to the drawings, *a* represents an electric motor carried in a casing *b* on top of the locomotive *c*, and provided with cranks *d* and *e*, which connect, respectively, to the handles *f* and *f'* of the throttle-valve and automatic brake on the one hand and the handle *f''* of the sand-distributer, all by means of levers *g*. The electric motor is in circuit by means of the conductors *h* with the battery *i*, located conveniently in the cow-catcher *j*.

Referring to Fig. 4, the battery *i* has a circuit-closer *i'*, whose terminals *h'* are in circuit with one of the conductors *h*. The circuit-closer *i'* carries an armature *i''* and is pivoted at *m*. A magnet *n* is within inductive relation to said armature and has one terminal *o* in circuit with a locomotive-wheel *p* and the other terminal *o'* in circuit with the trolley-wheel *p'*, which runs upon sectional conductors *q q' q'' q'''*, &c. The car-wheels necessarily make electric contact with the track which is in circuit with the ground. Therefore the locomotive-wheel *p* is electrically connected to ground. In order to prevent confusion, the locomotive is omitted from Fig. 2; but the operation of the system can be defined by representing thereon the magnet *n* in two positions, the one on one track and the other on the other track of one of the railways. One pole of the magnet is shown connected to a dotted line marked "Ground." The other pole of each magnet is represented as in contact by means of conductors *o'* and *o''* with the sections *q''* and Q, which are sections preferably not nearer than one-quarter of a mile of the point of crossing.

Let it be assumed that a locomotive is approaching the crossing in the direction of the arrow X, and on that track represented by the arrow. In passing a lever *r*, which is pivoted at the point *r'*, and which is pivoted to a lever *r''*, which is a circuit-closer, the locomotive-wheels operate the lever so as to close the circuit of the battery I at the points *s* through the magnet or magnets *n* of locomotive on the double track of the other railway. One of the contacts S is located upon the lever *r''*, and the other forms the terminal of the four conductors *t*, *t'*, *t''*, and *t'''*, two of which lead to the before-mentioned sections *q''* and Q, so that a current from the battery I will pass through the magnets *n*, which will operate the circuit-closer *i'* of each locomotive, and consequently the battery *i* will be closed through the motor *a*, which will operate the

handles *f*, *f'*, and *f''* in the same manner as an engineer, and the train in each instance will be brought to a full stop before reaching the crossing and a probable accident prevented.

In Fig. 3 the terminal of the battery I is represented by I', that terminal being the one which is permanently connected to ground, so that the return-circuit may be established for any magnet *n*.

After the train represented by the arrow X has crossed over and passed by the lever *r*, and, in fact, after any wheel of said train has done so, the contacts *s* separate and remain separate until other wheels operate said lever. When a train is approaching in the opposite direction, as represented by the arrow Y, it operates the lever R, which is pivoted at the point R' and to a lever or circuit-closer R'', which has contacts S, one of which forms the pole of a battery I'', located on the opposite side of the crossing from the battery I. The terminals of the battery I'' are connected by conductors *u* to a magnet *v*, whose armature *v'* is attached to the circuit-closer *r''*, so that when said battery is closed through the magnet the contacts *s* are closed and circuits formed through the magnets *n* in the same manner as when the train X operated the lever *r*.

In Figs. 7 and 8 the cams *w* project above the rail, so that the wheel on the track will force it to one side, the cam being pivoted to the lower part of the rail at the point *w'* in each case. The cam *w* presses upon a projecting pin *y*, so that when said cam is moved the lever *r* is turned upon the pivot *r'*, which is seen in Figs. 2 and 3.

I claim as my invention—

1. In an electric safety system for railway-crossings, the combination of locomotives provided with electric motors which are engaged with the throttle-valves, automatic brakes, and sand-distributers, electric batteries in circuit with said motors and carried by said locomotives, electro-magnets on the locomotives and in circuit with stationary batteries on one side of the crossing, circuit-closers for the first-named batteries controlled by said magnets, and levers projecting above the tracks and in the paths of the locomotive-wheels and engaged with circuit-closers for the stationary batteries.

2. In an electric safety system for railway-crossings, the combination of locomotives provided with electric motors which are engaged with the throttle-valves, automatic brakes, and sand-distributers, electric batteries in circuit with said motors and carried by said locomotives, electro-magnets on the locomotives and in circuit with stationary batteries on one side of the crossing, circuit-closers for the first-named batteries controlled by said magnets, levers projecting above the tracks and in the paths of the locomotive-wheels and engaged with circuit-closers for the stationary batteries, independent stationary batteries upon the opposite sides of the crossing, provided with circuit-closers controlled by the locomotives, and electro-magnets in circuit with the last-named batteries and controlling those circuit-closers which are in circuit with the first-named stationary batteries.

3. In an electric safety system for a railway-crossing, the combination, with any given track, of batteries located upon opposite sides of said crossing and at or near said track, a circuit-closer for each battery controlled by a train upon said track, the one battery being in circuit with relay-magnets upon the locomotives and the other in circuit with a relay-magnet for one of the said circuit-closers, the first-named relay-magnets controlling local circuits which include electric motors, and the motors being engaged with means, such as the throttle-valves, for stopping the locomotives within a predetermined distance of said crossing.

4. In an electric safety system for railway-crossings where one or more railway-tracks extend in one direction across one or more railway-tracks extending at an angle thereto, the combination of sectional conductors extending along each track, trains provided with magnets whose one set of terminals is provided with trolleys in contact with said conductors and whose other set is in contact with the ground through the wheels of the trains, the said magnets controlling local battery-circuits on the locomotives, and said circuits including electric motors which are engaged with means, such as automatic brakes, for stopping the trains, stationary batteries at the crossing grounded at one set of poles, the other poles being connected to those sectional conductors within a predetermined distance from said crossing, and circuit-closers for the last-named batteries controlled by the trains upon said tracks, substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 19th day of September, 1890.

EDWARD DEMING.

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