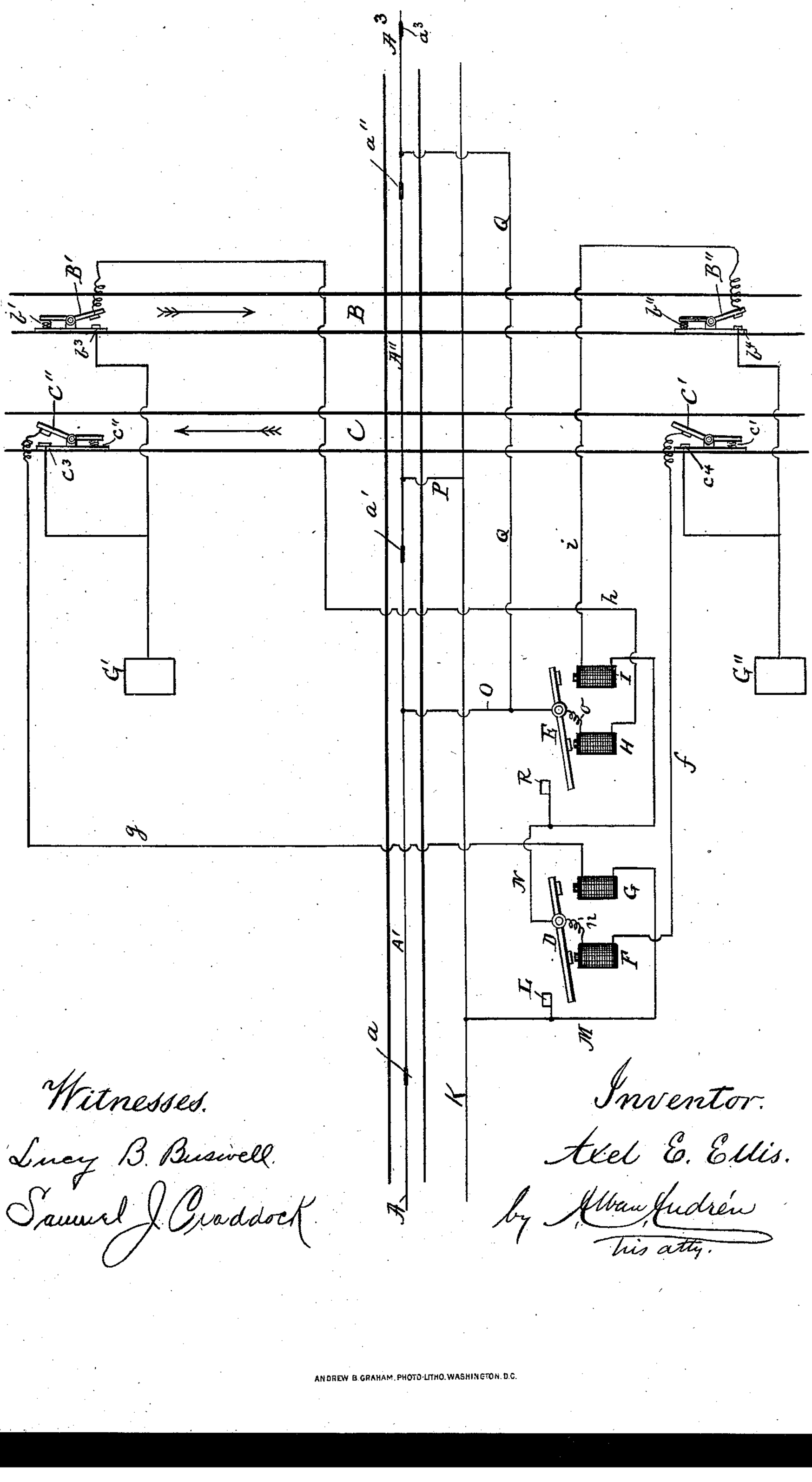
(No Model.)

A. E. ELLIS.

ELECTRIC BLOCK SYSTEM FOR RAILWAY CROSSINGS.

No. 556,139. Patented Mar. 10, 1896.



Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC BLOCK SYSTEM FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 556,139, dated March 10, 1896.

Application filed November 8, 1895. Serial No. 568,374. (No model.)

To all whom it may concern:

Be it known that I, AXEL E. ELLIS, a citizen of Sweden, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Electric Block Systems for Railway-Crossings, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in electric block systems for railway-crossings; and it has for its object the preventing of accidents at railway-crossings in systems where at least one of the bodies moving along the tracks is electrically operated and propelled by power from a conductor arranged parallel with the track upon which such body is moved.

The main object of my invention for the above-mentioned purpose is to automatically switch off the power-current from certain sections of the electrical conductor running parallel with the tracks if the crossing ahead is not clear or safe.

The invention comprises in its construction parts as follows: an electric-power conductor, divided in sections insulated from each other and the other part of the conductor in a way as will be later fully explained; a system of switches operated by electromagnets through which the electric-power current has to pass to reach certain later specified parts of the aforesaid insulated sections. Said switches may, if so desired, be inclosed in boxes suspended on poles and provided with a device by which the conductor of the passing car may at will close and open the same.

My invention is carried out as follows, reference being had to the accompanying drawing, which represents a diagrammatical view of the invention.

A system of switches is arranged in the vicinity of the railway-crossing and adapted to be operated by the moving cars on such crossing, one pole of said switches being connected to the return power-circuit and the other pole connected to conductors in series with the electromagnets of the aforesaid switch system.

A is the trolley-wire, divided in sections A′, A^2, and A^3 by means of insulators a and a' and a^2 a^3, as shown.

B and C are the tracks of a steam, electric, or other railroad where the trains run in opposite directions, as indicated by the arrows in the drawing.

B′ B″ and C′ C″ are electric switches placed near the respective tracks B and C in positions to be operated automatically by the moving trains.

D and E are switch-levers operated by electromagnets F G and H I, as shown.

K is the feed-wire that carries the power-current to the trolley-wire A; or the latter may be used as the feed-wire for the current, if so desired, without departing from the essence of my invention.

L is a switch contact-point which is connected by means of wire M to the feed-wire K and electromagnet G, as shown.

The switches B′ B″ C′ C″ are constructed so as to be held normally kept open by means of the respective springs b' b'' c' c'', as shown in the drawing.

b^3 b^4 c^3 c^4 represent contact-points on the respective switches B′ B″ C′ C″, as shown.

G′ is a ground connection from the switch contact-points b^3 and c^3, and G″ is a similar ground connection from the switch contact-points b^4 and c^4, as shown.

If a separate return circuit is used, b^3 b^4 c^3 c^4 will be connected to that circuit.

f is a wire leading from the electromagnet F to the switch C″.

g is a similar wire leading from the electromagnet G to the switch C′.

N is a wire leading from the switch-lever D to the electromagnet I, and from the latter leads a wire i to the switch B″.

n' is a wire leading from the electromagnet F to the switch-lever D and wire N, and R is a switch contact-point on said wire N for the lever E, as shown.

From the trolley-wire, A between the insulators a and a', leads a wire O to the switch-lever E, and from the latter leads a wire o to the electromagnet H, as shown. From the electromagnet H leads a wire h to the switch-lever B′, as shown.

P is a wire connecting the trolley-wire A and feed-wire K between the insulators a' and a'', as shown, and Q is a wire connecting the trolley-wire A between the insulation a'' and a^3 with the wire O, as shown.

The section A″ of the trolley-wire is constantly connected with the feed-wire K by means of the conductor P, as shown.

The operation is as follows: Suppose that a train is passing along the track C in the direction of the arrow shown and in reaching the switch C′ causes the latter to be closed against the contact c^4, and if the switch-lever D is supposed to be in a position closed against the contact L, then the circuit will be closed through the electromagnet F causing the armature-lever D to be disconnected from the contact L, as shown in the drawing, and consequently the sections A′ and A^3 will be cut out from the feed-wire K, and if a car is on either of such sections or reaches them when they are so disconnected it will stop from lack of motive power, and a previously-lighted lamp in the car by being extinguished may also call the attention of the motorman or conductor to the fact that the crossing is not safe. If, however, the car has reached section A″ of the trolley-wire or else is so near that section when switch C′ is closed that the momentum of the car will carry it to that always-electrically-charged section, then the car can with safety pass to the other side, because the switch C′ is supposed to be situated far enough from the crossing for the above purpose.

Suppose that the train on track C proceeds forward, and after passing the crossing of the trolley-track reaches the switch C″ and closes it. The current from the feed-wire K will then be closed through the electromagnet G, by which the latter causes the armature-lever D to be attracted to it and thereby causes the sections A′ A^3 of the trolley-wire to be again electrically charged to furnish any waiting cars with motive power, provided lever E is closed against contact R. A train moving on track B and working the switches B′ and B″ will in a similar manner operate the switch-lever E, and with the same effect.

It is evident that the same system is applicable whether the crossing tracks are single or double, or one single and the other double, or whether both roads carry electrically-propelled trains or only one of them does, and whether the electric road is built on the trolley system or the underground-conduit system, or whether the trolley-wire serves as a feed-wire or whether there is a separate feed-wire connected to the trolley-wire.

This system is also applicable to crossings at drawbridges or swinging or other bridges.

The advantages of this invention are, first, that it works absolutely automatically; second, as the power-current is used to operate the switches, there is always a very powerful current ready to do that work.

The switches D and E will of course have to be constructed so as to stay opened or closed until excited by their respective electromagnets.

It is evident that the switches D and E which cut out the power-current from sections A′ and A″ may be operated automatically in many different ways, as by closing the gates across the crossing, opening of a bridge, or otherwise.

If the electric railway is double tracked, it is advantageous to arrange one of the cut-out sections of the power-conductor on one track and the other one on the other track, but so that the cars on both tracks reach the cut-out sections before they reach the crossing.

It is evident that by placing electrically-operated switches—as many in number as there are tracks crossing the electric-railway tracks—in series these switches, or some of them, will remain open and the insulated sections of the power-conductor remain cut out until all trains entering the block inclosing the railway-crossing have moved outside of the same.

What I wish to secure by Letters Patent and claim is—

In an electric block system for railway-crossings, the combination with two or more intersecting tracks, of an electrical conductor for furnishing energy to motor-cars, said conductor being provided with insulated sections on each side of the crossing and with a constantly-live section across the crossing, switches D and E for throwing said insulated sections in and out of circuit, electromagnets for actuating said switches, normally-open shunt-circuits electrically connected with the power supply and including the said switches and their magnets, and contact-closers arranged on the intersecting track upon each side of the crossing and adapted to be operated by a passing car to first throw the said insulated sections of the electrical conductor out of circuit and afterward into circuit, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 2d day of October, A. D. 1895.

AXEL E. ELLIS.

Witnesses:
ALBAN ANDRÉN,
LUCY B. BUSWELL.