(No Model.) 3 Sheets—Sheet 1.

# G. W. McCLINTOCK & D. J. McLANE.

## CLOSED CONDUIT ELECTRIC RAILWAY.

No. 532,576. Patented Jan. 15, 1895.

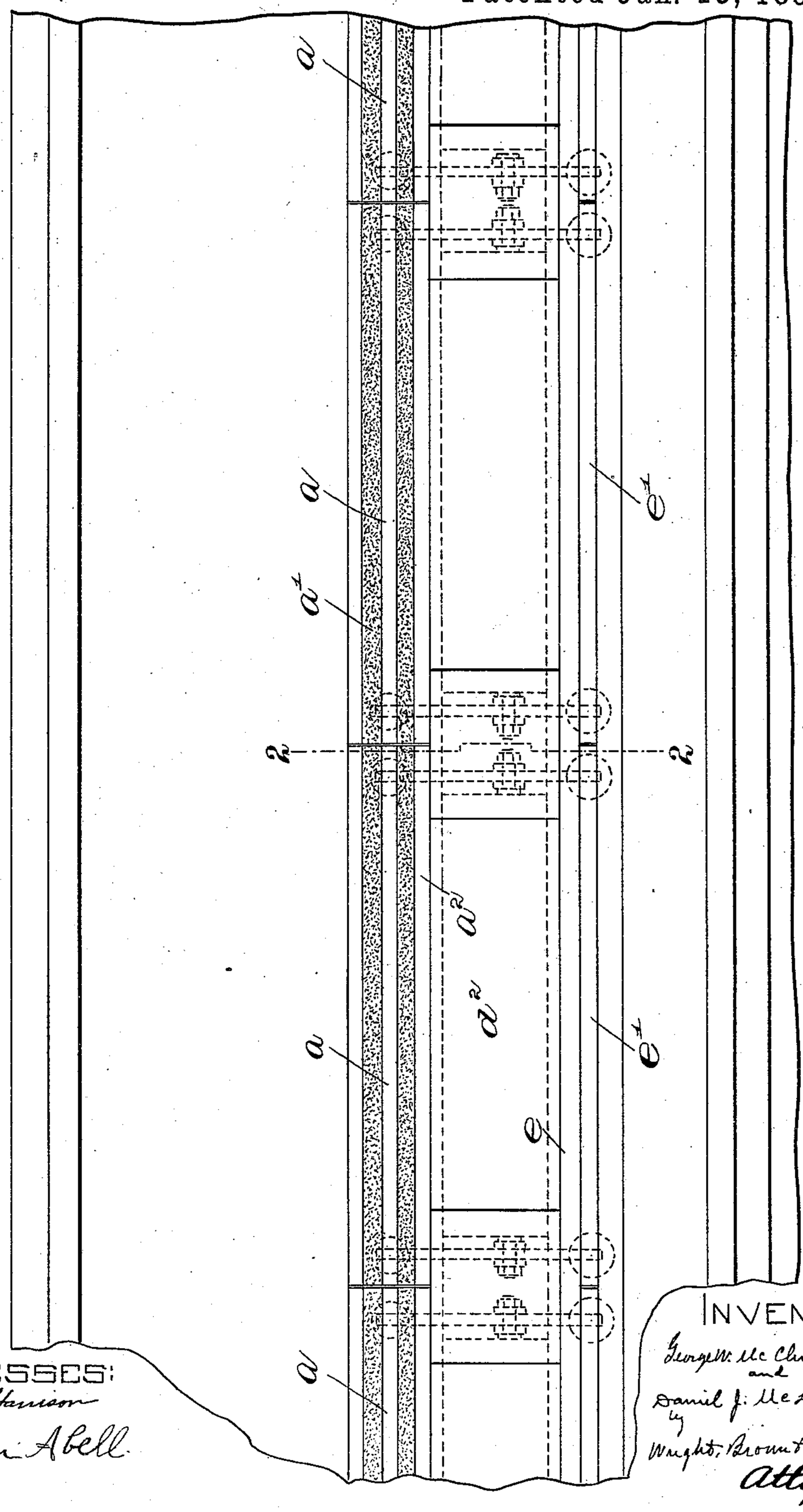


FIG. 1.

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FIG. 2.

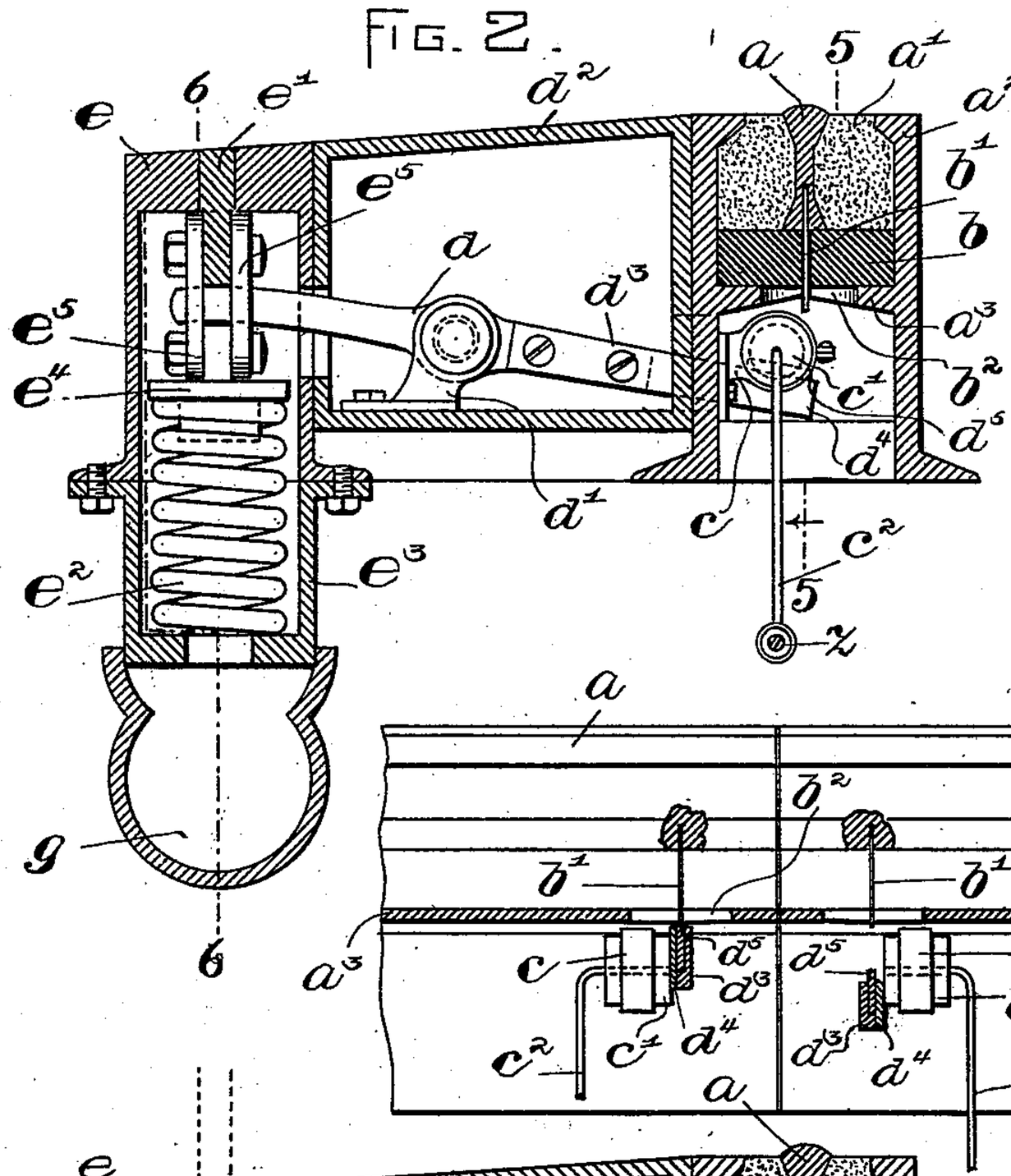


FIG. 5.




FIG. 3.

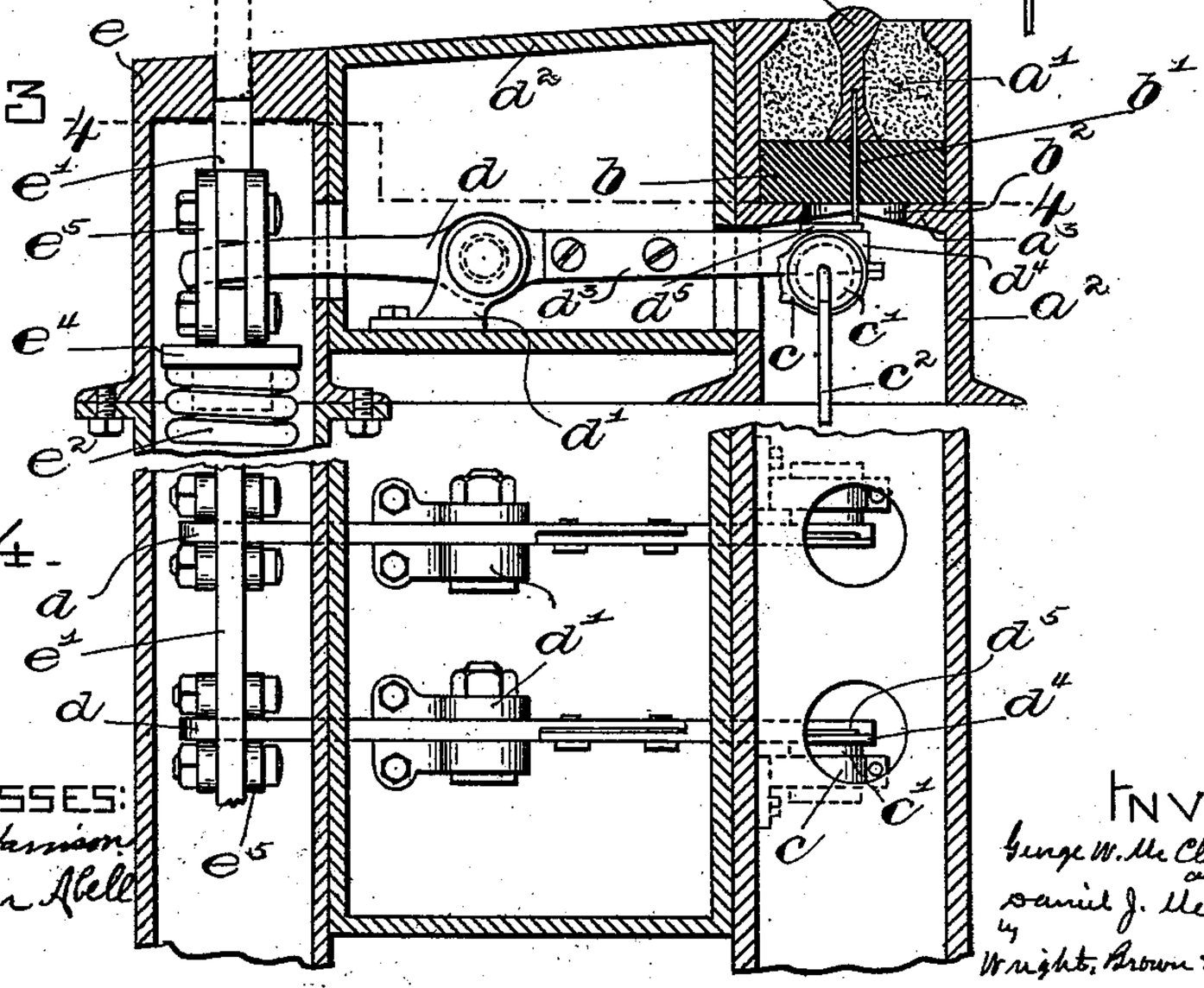


FIG. 4.

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(No Model.) 3 Sheets—Sheet 3.

# G. W. McCLINTOCK & D. J. McLANE.

## CLOSED CONDUIT ELECTRIC RAILWAY.

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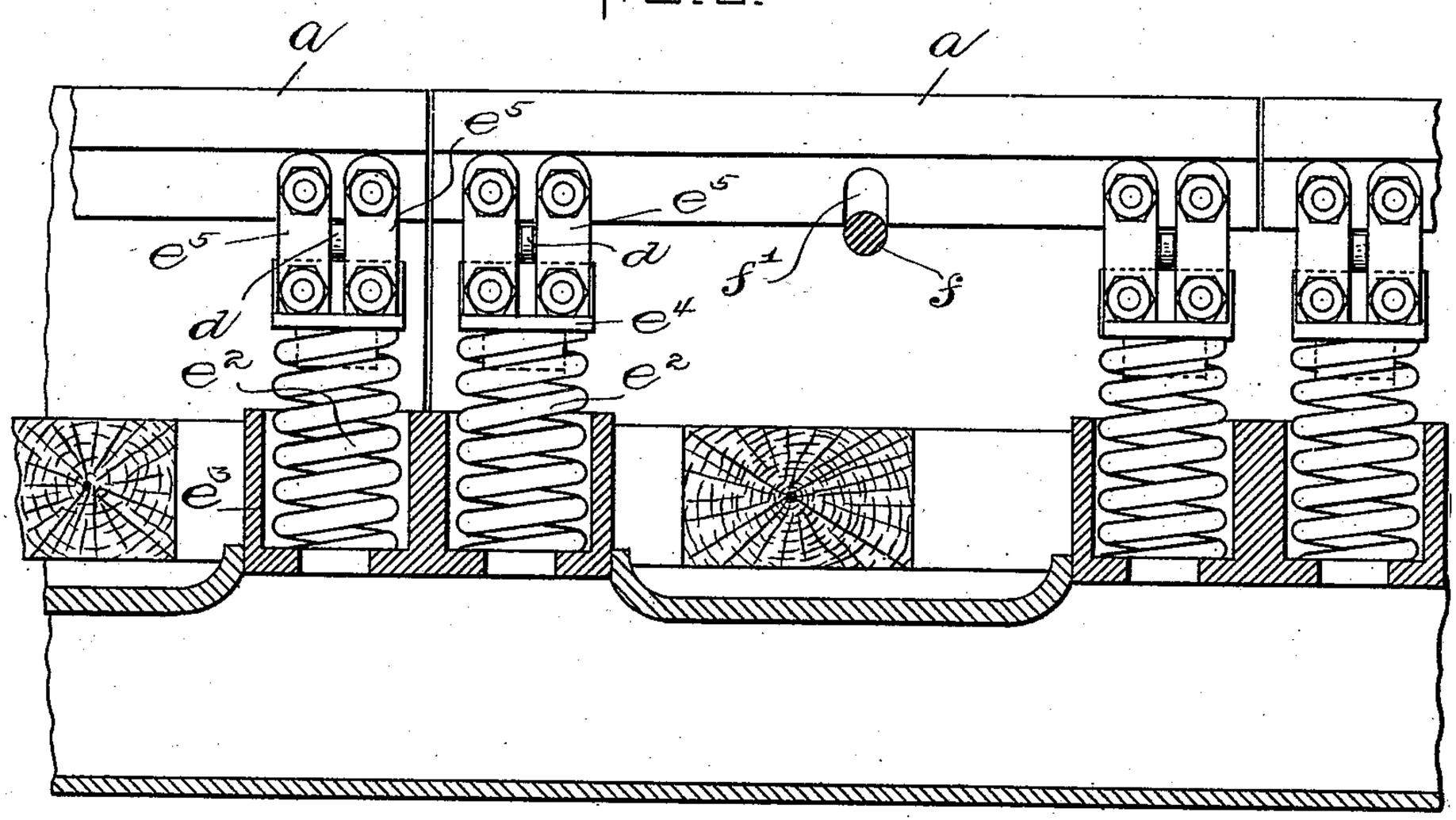
FIG. 6.

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# UNITED STATES PATENT OFFICE.

GEORGE W. McCLINTOCK, OF WOLLASTON, AND DANIEL J. McLANE, OF QUINCY, MASSACHUSETTS.

## CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 532,576, dated January 15, 1895.

Application filed July 2, 1894. Serial No. 516,338. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE W. McCLINTOCK, of Wollaston, and DANIEL J. McLANE, of Quincy, in the county of Norfolk, State of Massachusetts, have invented certain new and useful Improvements in Electric-Trolley Railways, of which the following is a specification.

The object of the present invention is to provide an electric railway system in which an exposed conductor is arranged in the roadbed in such a manner that different sections of it are successively charged as a car passes along, so that the car always covers that section charged, and all sections of the conductor not covered by a car carry no charge, and hence the conductor is no menace to life although exposed and conveniently accessible to the trolley-wheel on the car.

To the above end, the invention consists in certain novel features of construction and combinations of parts recited in the appended claims.

The accompanying drawings, which form part of this specification, illustrate different structures embodying the invention.

Figure 1 shows a top plan view of a section of roadbed constructed in accordance with our invention. Fig. 2 shows a section on line 2—2 of Fig. 1, representing a circuit-closing switch as open. Fig. 3 shows a similar view, with the switch closed. Fig. 4 show a horizontal section taken on line 4—4 of Fig. 3, and representing two of the circuit-closing switches. Fig. 5 shows a section on line 5—5 of Fig. 2, with certain insulation omitted and one switch closed and another open. Fig. 6 shows a section on line 6—6 of Fig. 2.

In carrying out our invention, we lay a third rail in the center of the roadbed, said rail being made up of sections $a$ insulated from each other and from their surroundings. Said third rail is embedded in cement $a'$, but protrudes sufficiently above the same to be traversed by a trolley-wheel on a car. The rail and its bed of cement are supported in suitably constructed castings $a^2$ formed with a horizontal web $a^3$ on which a block $b$ of insulation rests, and the rail stands on this block of insulation. The rail-sections $a$ are designed to be successively charged, and to this end each section has connected with it conductor-wires $b'$ which pass down through the insulation and through openings $b^2$ in the horizontal web of the casting, said wires terminating just below said horizontal web and designed to be electrically connected with the feed-wire $z$ of the system, through devices presently to be described.

A bracket $c$ is fastened to one side of the casting $a^2$, adjacent to each wire $b'$, and is formed with a split ring, in which is clamped a disk $c'$ of suitable insulating material. A branch wire $c^2$ from the feed-wire of the system is entered through each of such disks of insulation, and its end is exposed at one side thereof. This branch wire $c^2$ is designed to be connected with the wire $b'$ by a switch arranged to be closed by the passing car. This switch is in the form of a lever $d$ pivoted intermediate of its ends to a bracket $d'$ in a casting $d^2$ arranged adjacent to the casting $a^2$. One arm $d^3$ of the lever extends through slots in the castings and alongside the bracket $c$, and this arm is a separate piece from the rest of the lever, being composed of insulating material, as hard rubber, and rigidly fastened to the metal part of the lever. This insulating arm of the lever is recessed near its end in the side toward the bracket $c$ to receive a metallic plate $d^5$ which projects above the upper edge of the arm and is adapted to make contact with the wire $b'$ when the arm is raised. Another metal plate $d^4$ is fastened over the plate $d^5$, and is arranged to make contact with the wire $c^2$, so that through these plates the wires $b'$ and $c^2$ are electrically connected.

In other castings $e$ alongside the castings $d^2$ is arranged a trolley-rail made up of bars $e'$ fitted to slots in the upper sides of the castings and vertically movable therein, and each bar corresponds with one length of the conductor-rail $a$. The bar is upheld so as to be normally flush with the upper surface of the casting, by spiral springs $e^2$, one at each end of the bar. These springs are received in pockets $e^3$ bolted to the castings $e$, and bear at their lower ends against the bottom of said pockets, while their upper ends receive studs formed on plates $e^4$ resting on the

springs and formed with ears to which links $e^5$ are bolted, said links being bolted at their opposite ends to the bar.

The outer arms of levers $d$ pass through slots in the castings $d^2$ and $e$, and fit between the links $e^5$.

There are two switch-levers to each section of conductor-rail and each bar $e'$, and when the bar is depressed both levers are operated.

Each car carries a trolley-wheel to traverse the rail $a$, and also a trolley-wheel to traverse the rail $e'$; and this latter wheel is arranged to depress the bars $e'$ one after another, as the car moves along. By the depression of the bars $e'$, the sections of the conductor-rail $a$ are successively connected with the feed-wire, by the switch-levers, which are actuated by the bars so as to connect the wires $b'$ and $c^2$. As soon as the depressing wheel leaves a bar $e'$, it is immediately restored by the springs $e^2$, and the circuit through the corresponding section of the conductor-rail is broken.

The length of the sections of the conductor-rail is such that the one charged will always be covered by the car, so that this exposed conductor can offer no menace to life.

Endwise movement of the switch-operating bars $e'$ is prevented by rods $f$ fastened across the castings $e$ and engaging slots $f'$ in the bars.

A conduit $g$ extends below the castings $e$ for purposes of drainage.

It is evident the invention is not limited to any one form of structure, but is capable of embodiment in various ways.

Having thus described means for embodying our invention, what we claim is as follows:

1. In an electric railway system, the combination of an exposed sectional conductor-rail with insulation between its sections and each section provided with depending contact-pieces, a feeder having branches for connection with the pendent contact-pieces of the conductor-rail, respectively, a trolley-rail composed of depressible spring-supported sections corresponding with the sections of the conductor-rail, and switch-levers centrally pivoted to bearings intermediate of the conductor-rail and trolley-rail and extending under the latter on one side of their pivots and carrying contact-plates on the opposite side for connecting the branches of the feeder with the contacts on the conductor-rail by vertical movement when the trolley rail is depressed, substantially as described.

2. In an electric railway system, the combination of an exposed sectional conductor-rail with insulation between its sections and each section provided with depending contact-pieces, a feeder having branches for connection with the pendent contact-pieces of the conductor-rail, respectively, brackets supporting insulation in which the said branches of the feeder are inserted with their ends exposed at one side, a trolley-rail composed of depressible spring-supported sections corresponding with the sections of the conductor-rail, and switch-levers pivoted between the conductor-rail and trolley-rail and movable in vertical planes at right angles to the latter's plane of movement, the said levers extending under the trolley-rail on one side of their pivots and carrying contact-plates at their opposite ends arranged to move along the supports of the feeder-branches and connect the latter with the pendent contacts of the conductor-rail when the trolley-rail is depressed, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 2d day of June, A. D. 1894.

GEORGE W. McCLINTOCK.
DANIEL J. McLANE.

Witnesses:
HORACE BROWN,
F. P. DAVIS.