(No Model.)

H. H. CUTLER.

CIRCUIT FOR ELECTRIC RAILWAYS.

No. 407,470. Patented July 23, 1889.

Fig. 1.

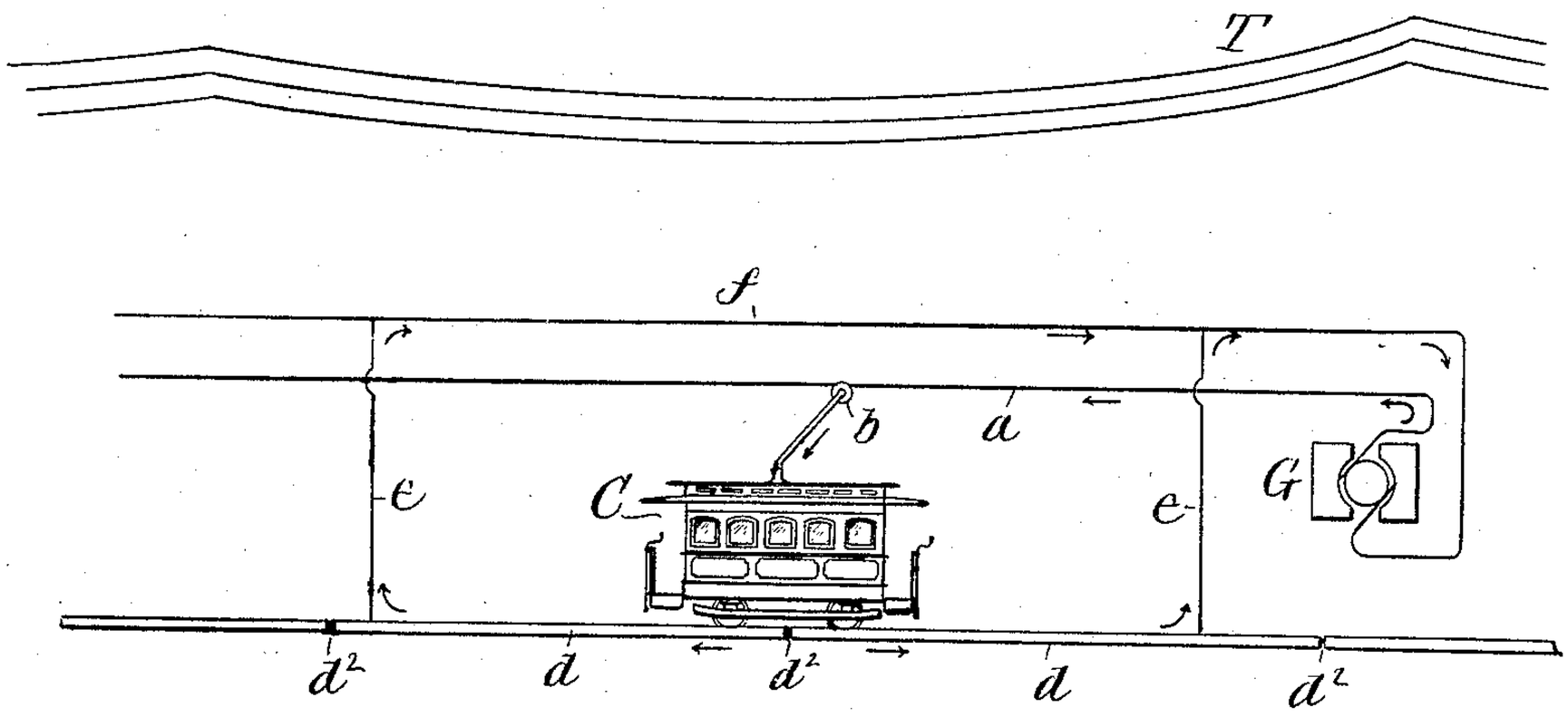
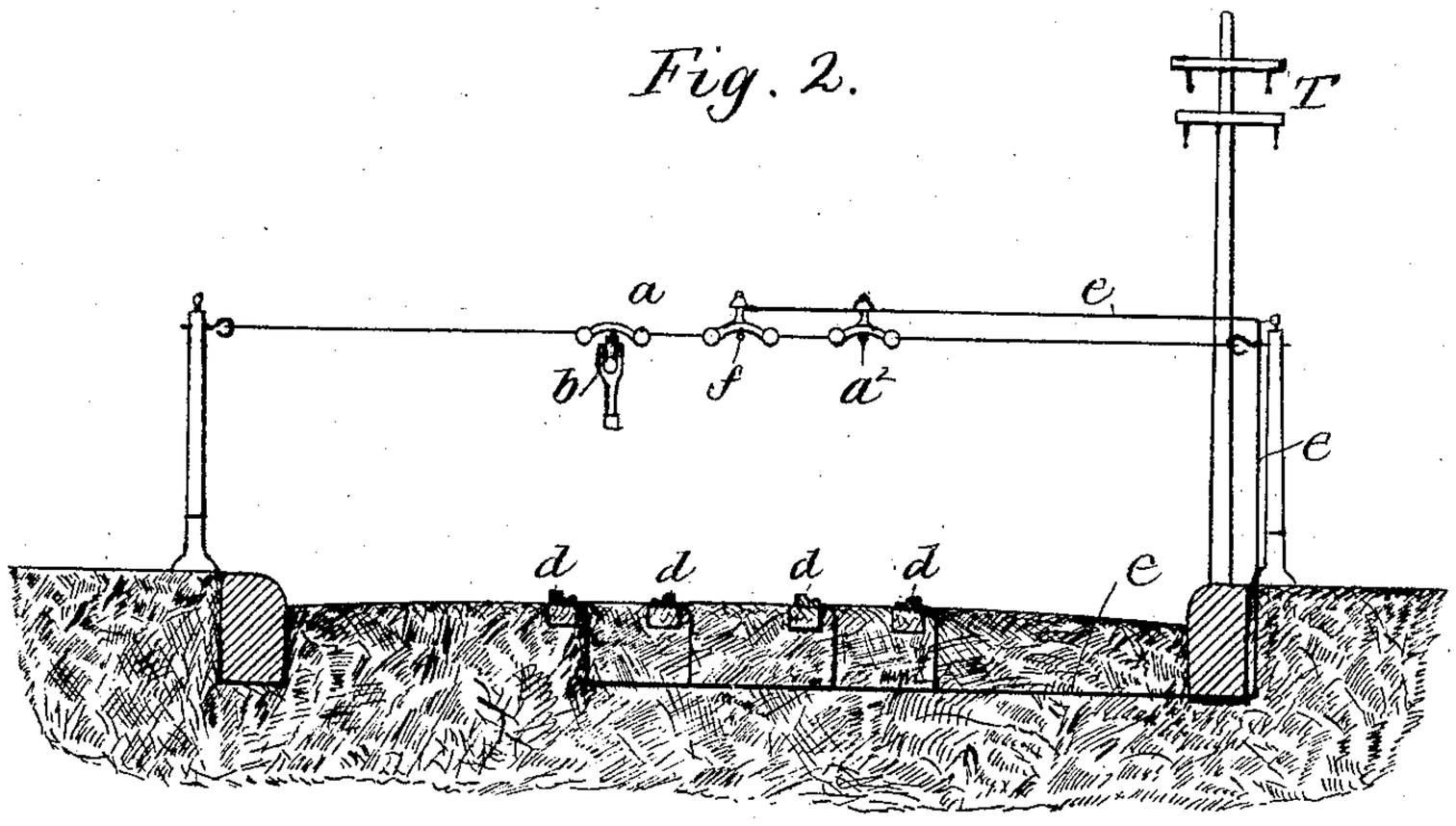


Fig. 2.



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CIRCUIT FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 407,470, dated July 23, 1889.

Application filed April 13, 1889. Serial No. 307,095. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. CUTLER, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Circuits for Electric Street-Railways, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The object of my invention is to prevent disturbances in telephone or other lines running through the same streets with electric railways in which the current is conveyed to the motor on the railway-car from two main leads or conductors connected with the terminals of an electric generator.

In electric-railway systems in which the current is supplied from a stationary generator the motor on the car or train must have terminals that must be kept in contact with the conductors extending along parallel with the track and connected with the opposite terminals of the generator, and in one system that is now in use one of the terminals of the car-motor connects with the wheels of the car and the other with a contact-piece commonly called a "trolley" and usually placed some distance above the top of the car. These terminals while the car is in operation make contact one with the rails of the track and the other with an overhead or aerial conductor, said track and conductor being respectively connected with the terminals of the generator. The rails and the overhead conductor thus perform two functions, one as a main lead or conductor for conveying the current from the generator and the other as a continuous contact-piece for the purpose of affording connection between the said main leads and the motor on the car by means of the motor contact-terminals which travel with the car. When the rails and overhead conductor thus form the main leads or conductors for conveying the current from the generator, serious disturbances are produced in adjacent telephone-lines by induction, leakage, or earth-currents from the said current-supplying conductors of the railway system, owing to the fact that the telephone-lines are nearer to and thus more exposed to leakage from one than from the other of the said railway current-supplying conductors.

The object of the present invention is to overcome this objection; and the invention consists, mainly, in placing the two main leads or current-supplying conductors for the railway system in close proximity to one another and connecting one or both of the said leads at various points with short sections insulated from one another of a contact-conductor co-operating with the traveling contact forming one terminal of the motor carried by the car. Thus although the parts that afford the contact-surface for the traveling contacts are at considerable distance from one another—one, for example, being at the surface of the ground and the other in the air at some distance above the ground—the main current-supplying leads of the railway system themselves are near one another and substantially at the same distance from telephone or other lines in the same street, so that the effects upon other lines derived from induction, leakage, &c., from the said main leads are of opposite character and neutralize one another in the exposed lines.

Figure 1 is a diagram of a circuit of an electric street-railway embodying this invention, the railway-car being shown in side elevation; and Fig. 2, a transverse section of the street-railway apparatus, showing the car in end elevation.

In this instance the main current-supplying wires or leads *a* and *f*, connected with the opposite poles of the generator G, are shown as aerial lines supported above the car-track in any usual manner, one of said leads, as *a*, also constituting a continuous contact-piece that co-operates with the trolley *b* on the car C, said trolley forming or being connected with one terminal of the motor on the car, and thus keeping said terminal in connection with the lead *a* and one terminal of the generator during the movement of the car. The other terminal of the motor on the car connects with the wheels or running-gear of the car, so that it may be maintained in contact with the rails *d;* but instead of making the said rails *d* or second contact for the motor-terminal continuous and connected directly with the other terminal of the generator, so as to constitute the other lead or main current-supplying line, as has heretofore been usually practiced, the said rails or contact-surfaces have their con-

ductivity interrupted from point to point, as indicated at d^2, Fig. 1, thus breaking the stationary contact for one terminal of the car-motor into short sections, which sections are connected with the other main lead f by connecting-wires e.

When the main leads a and f are aerial lines, they may be supported in the same manner as the usual trolley-wires of railway systems, as shown in Fig. 2, and for a double-track road the lead f should be placed midway between the two trolley-wires a and a^2, constituting the lead of opposite polarity, and in any case the two main leads or continuous current-supplying conductors connected with the opposite poles of the generator G should be placed so as to be about at equal distance from the telephone or other wires T, that would otherwise be disturbed by currents passing through the said leads, so that any disturbances that would be derived from one of said leads if much nearer the telephone-wires than the other will by this arrangement be neutralized by the disturbance of opposite polarity derived from the other lead. By this construction the currents will pass through the circuits, as illustrated by arrows, Fig. 1, traversing the main leads a and f in opposite directions, and thus will produce no disturbances in the telephone-wires T, such result being obtained without the disadvantages of the double-trolley system, in which the main leads, although placed near one another, are both depended upon to provide the continuous contact-surface for connection with the traveling contacts on the car.

In the circuit forming the subject of the present invention one of the usual stationary contacts may be made continuous, and also constitute one of the main leads, while the other contact is broken into short sections and does not constitute the other main lead, but has its several sections connected with the other main lead, which is placed in proximity to the one that is retained as a contact-surface.

I claim—

A circuit for an electric railway, comprising two conductors or main leads connected with opposite terminals of the generator and placed in proximity to one another, whereby each neutralizes the disturbing effect of the other upon adjacent lines, and a contact surface or conductor made in short sections electrically insulated from one another, but with each of said sections connected with one of said main leads, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY H. CUTLER.

Witnesses:
JOS. P. LIVERMORE,
JAS. J. MALONEY.