

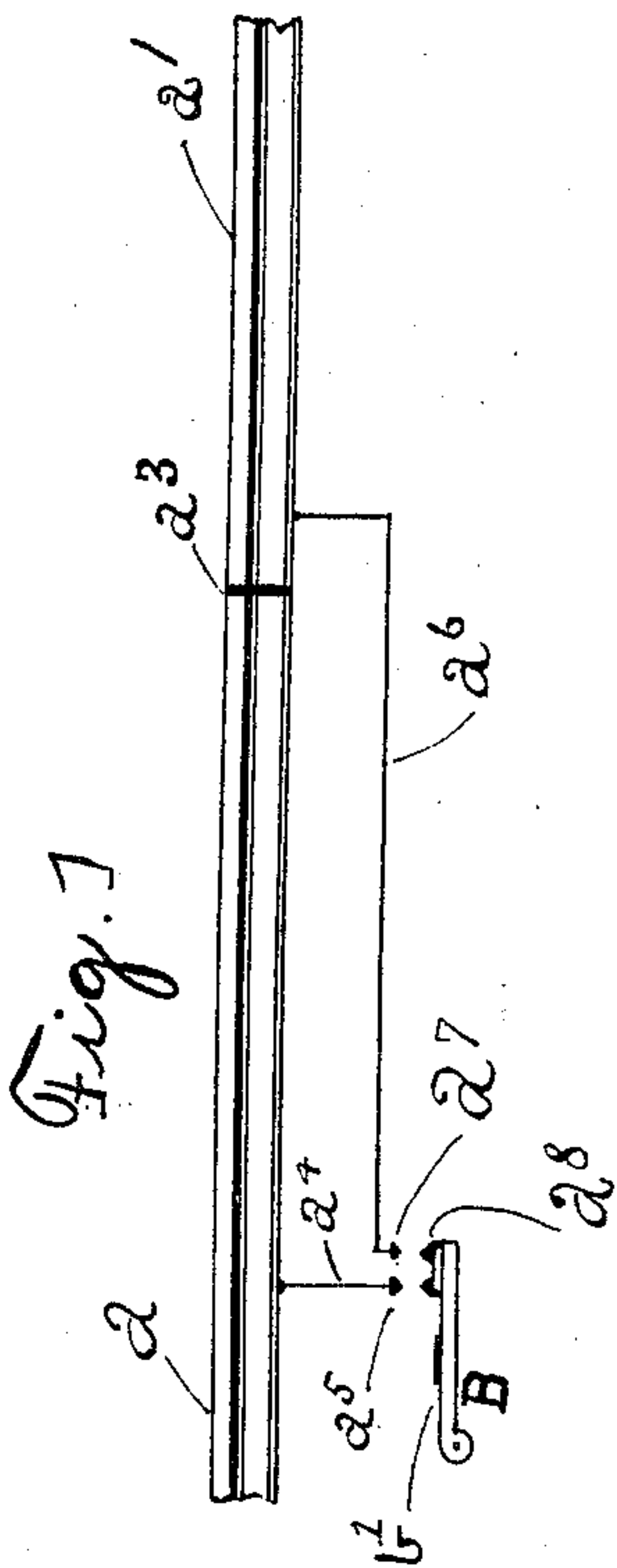
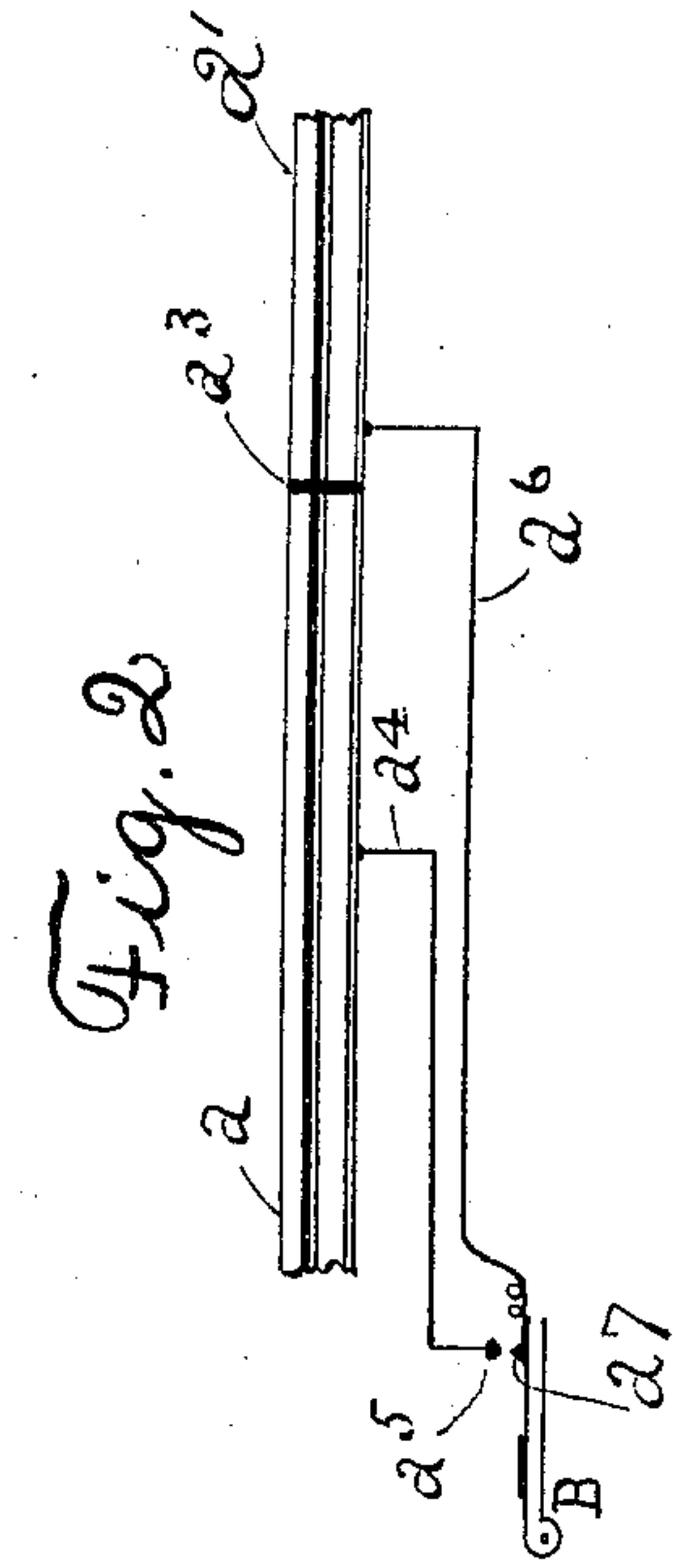
No. 785,447.

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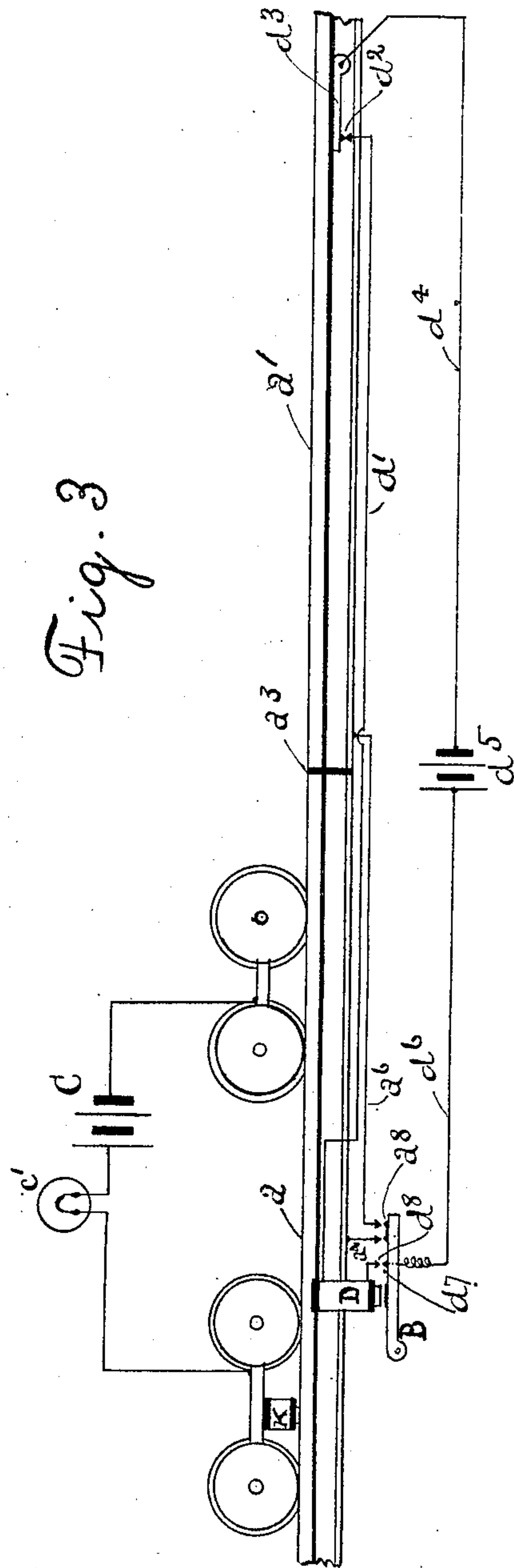
G. THOMPSON.

PARTIAL CIRCUITS FOR ELECTRIC CURRENTS.

APPLICATION FILED AUG. 2, 1902.



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# UNITED STATES PATENT OFFICE.

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## PARTIAL CIRCUITS FOR ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 785,447, dated March 21, 1905.

Application filed August 2, 1902. Serial No. 118,070.

*To all whom it may concern:*

Be it known that I, GUION THOMPSON, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain Improvements in Partial Circuits for Electric Currents, of which the following is a specification.

My invention relates to partial circuits for electric currents, and has for its object the provision of relatively stationary means located on the route of a conveyance and which upon the fulfilment of certain predetermined conditions will be adapted to complete a circuit partly established on a conveyance and including a source of electricity when said conveyance brings the partial circuit established thereon into communication with said relatively stationary partial circuit.

With this and other objects in view it consists of two alined stationary conductors of electricity normally insulated from each other, electricity-conducting means extending from each of said alined conductors and provided with terminal contacts, intermediate electricity-conducting means normally independent of said contacts adapted in operation to contact with the same, and means for governing the position of such intermediate means.

It also consists of certain other constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a diagram of my said invention. Fig. 2 is a diagram of a modified construction of the same. Fig. 3 is a diagram of my said invention, showing for the purpose of illustrating one of the utilities of the same a conveyance and a partial circuit established thereon and including a source of electricity, and showing, further, a suitable means, partly on said conveyance and partly anchored on said route, for operating the relatively movable element forming part of my said invention.

In the drawings,  $a$  and  $a'$  are alined conductors of electricity, preferably constituting sections of a railway-track rail, separated at their abutting ends by an insulator  $a^3$ . Connected to said section  $a$  is a conductor of elec-

tricity  $a^4$ , extending therefrom and provided at its opposite end with a contact  $a^5$ . Connected to said section  $a'$  is a conductor of electricity  $a^6$ , provided at its opposite end with a contact  $a^7$ , adapted to contact directly with said contact  $a^5$ , as contemplated in said Fig. 2, or to communicate with the same through the medium of an intermediate double contact  $a^8$ , as contemplated in said Fig. 1, or through any other suitable construction, as desired.

$B$  is a bar or lever having a limited movement and preferably pivoted to a suitable support (not shown) and embodying an armature  $b'$  and adapted to support said double contact  $a^8$ , as in Fig. 1, or to support said contact  $a^7$ , as in Fig. 2, and to govern the communications between said contacts  $a^5$  and  $a^7$ , which contacts  $a^5$  and  $a^7$  are normally non-intercommunicative. In operation when said contacts  $a^5$  and  $a^7$  are brought by said lever into direct contact with each other or into mutual contact with said contact  $a^8$  a partial circuit is established from and including conductor  $a$  to and including conductor  $a'$  through said conductors  $a^4$  and  $a^6$  and said contacting contacts and around said insulator  $a^3$ .

For the purpose of illustrating the utility of my said invention I have shown in Fig. 2 of said drawings my invention incorporated in a railway signal system comprising track-rail sections  $a$  and  $a'$  and insulator  $a^3$ , a conveyance moving thereon and in part forming a partial circuit including a source of electricity  $C$  and a safety signal-lamp  $c'$ , carried thereby, the opposite poles of which source communicate, respectively, through intermediate electricity-conducting means, including said lamp and the fore and aft, respectively, insulated trucks of said conveyance, with the track-rails of which said sections form a part, which intermediate means, in cooperation with any single section of said track with which the wheels of both of said trucks contact, form a complete circuit, which will, subject to the operation of my said invention, be interrupted when the said forward truck rests upon said section  $a'$  and said rear truck rests upon said section  $a$ , separated by said insulator  $a^3$ .



Said system may be assumed to comprise, further, means for operating the contact-governing lever or armature B, which operating means comprises, first, an electromagnet D, anchored on the route of said conveyance in a position in which it is adapted when energized to attract said armature B, a normally open local circuit including the coil of said electromagnet, a conductor  $d'$ , a normally closed distant contact  $d^2$ , governed by an armature  $d^3$ , a conductor  $d^4$ , a source of electricity  $d^5$ , a conductor  $d^6$ , and a contact  $d^7$ , supported by said armature B and adapted to contact with a contact  $d^8$  upon one of the ends of said coil, and, second, a transient magnet K, carried by said conveyance and adapted to pass over said electromagnet D and in passing to transmit magnetic energy to the same.

It is now obvious that so long as said conveyance rests wholly on said section  $a$  the said circuit partially established on said conveyance will be completed by said rail-section and that as said conveyance proceeds and brings the magnet K over said electromagnet D said magnet D will be momentarily energized and will thereupon attract said armature B, which will close the contact between contacts  $d^7$  and  $d^8$ , and thus close the circuit which includes the coil of said electromagnet, thereby continuing the vitality of said electromagnet. At the same time the operation of said armature B closes the partial circuit including said sections  $a$  and  $a'$  and said conductors  $a^4$  and  $a^6$  and said contacts  $a^5$ ,  $a^7$ , and  $a^8$ . As the conveyance proceeds and its forward truck crosses the insulator  $a^3$  the circuit partially established on the conveyance will be completed through the partial circuit comprising section  $a$ , the conductor  $a^4$ , the conductor  $a^6$ , and said contacts  $a^5$ ,  $a^7$ , and  $a^8$ , which partial circuit will remain closed until said conveyance brings said magnet K over the distant armature  $d^3$ , in which event said magnet K will attract said armature  $d^3$  and break the normally closed contact  $d^2$  governed thereby, thus interrupting the circuit including the coil of said electromagnet, whereupon said electromagnet will become inert and permit said armature B to drop, breaking the continuity of said partial circuit from section  $a$  to section  $a'$ . It may now be assumed that the circuit including the coil of said electromagnet D controls certain other signal apparatus (not shown in the drawings) which during the operation of said last-named circuit would operate to disclose to the driver of said conveyance the presence of any similar conveyance on the track between said electromagnet D and said distant armature  $d^3$ , but which in event of the failure of said last-named circuit through the exhaustion of said battery  $d^5$  or the breaking of one of the conductors or otherwise would operate normally to indicate to the driver of said conveyance a clear track from said electromagnet D to said

distant armature  $d^3$  though said track might, in fact, be occupied, such a condition being disclosed by my application under petition of even date herewith for patent for interruptable bridging-circuits for electric currents. It is clear, however, that the failure of said circuit resulting in such assumed safety-signals will render my said partial circuit inoperative. The principal office of my invention is therefore by its operation to assure the driver of the conveyance that the local circuit otherwise governing safety and danger signals is in working order, failing which when the first truck of said conveyance rests on section  $a'$  and the rear truck thereof rests on section  $a$  there will be no completion of the circuit partially established on said conveyance, and said safety signal-light  $c'$  will be extinguished, and said driver will thus be made aware that said circuits are out of order and that said assumed safety-signals are not longer to be relied on. My said invention may therefore be regarded as a fail to danger construction and of great importance as distinguished from a construction by which the failure of the local operating-circuits will leave only safety-signals displayed.

While I have shown certain forms of my said invention, it is evident that the minor details of arrangement and construction thereof may be modified or altered in some respects without affecting the general character of the same and all within the scope of said invention, and that any suitable means of support or fastening may be used, and that such invention may be made to govern other signals or complete or break other circuits, or may be incorporated with other mechanisms or systems without affecting its identity. It is further my intention to apply for other patents for constructions shown to illustrate the utility of my said invention.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a normally open electric circuit including a source of electricity, an electromagnet and a normally open circuit-controlling contact; an armature for said magnet adapted when operated to close said contact; a partial circuit comprising a normally open circuit-controlling contact governed by said armature, conductors extending from the opposite points of the last said contact and provided at their outer ends with normally open contacts; a conveyance; a normally closed circuit partly carried thereby and including a source of electricity, conductors on said conveyance extending from the opposite poles of said source, adapted to contact during passage with the outward contacts of said partial circuit to loop said partial circuit into the partial circuit carried by said conveyance; a conductor or conductors adjoining said conveyance and, when said conveyance is in certain



positions, including one or both of the outward contacts of said partial circuit and adapted normally to close the partial circuit carried by said conveyance; means carried by said conveyance adapted to operate said armature before said conveyance has reached the position where both of said outward contacts are included in the circuit partly carried by said conveyance, substantially as described.

2. The combination of a normally open electric circuit, including a source of electricity, a normally closed circuit-controlling contact, an electromagnet and a normally open circuit-controlling contact; an armature for said magnet adapted when operated to close said open contact; a lever adapted to open said normally closed contact; a partial circuit comprising a normally open circuit-controlling contact governed by said armature, conductors extending from the opposite points of the last said contact and provided at their outer ends with normally open contacts; a conveyance; a normally closed circuit partly carried by said convey-

ance and including a source of electricity, conductors extending from the opposite poles thereof, a conductor or conductors adjoining said conveyance and, when said conveyance is in certain positions, including one or both of the outward contacts of said partial circuit; means carried by said conveyance adapted to operate said armature before said conveyance has reached the position where both of said outward contacts are included in the circuit partly carried by said conveyance, and means carried by said conveyance adapted to operate said lever after said conveyance has passed the position in which said outward contacts are included in the circuit partly carried by said conveyance, substantially as described.

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

GUION THOMPSON.

Witnesses:

JNO. D. WATSON,  
JAMES T. WATSON.