

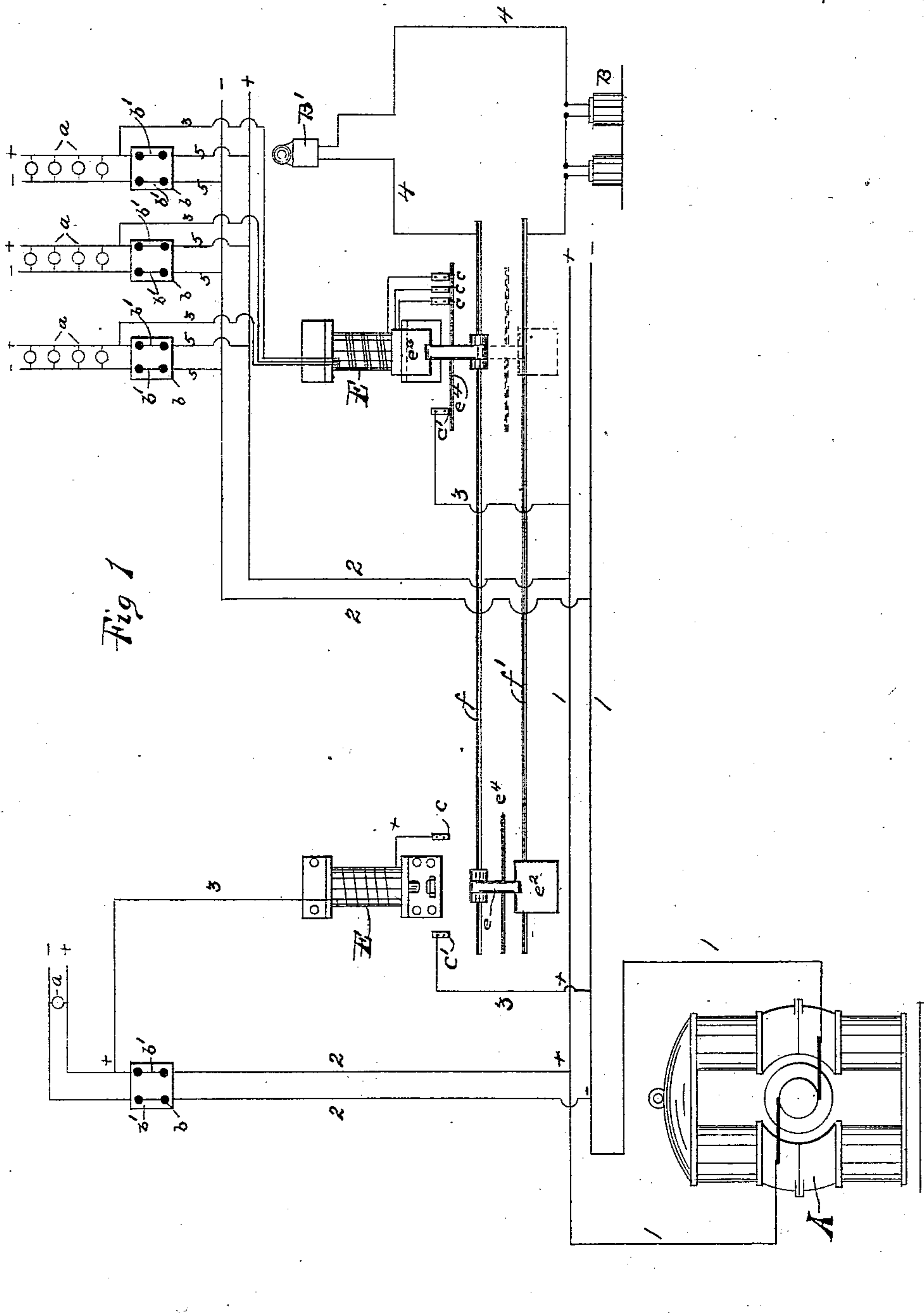
(No Model.)

2 Sheets—Sheet 1.

E. C. MYRICK.  
ELECTRIC DISTRIBUTION SYSTEM.

No. 555,326.

Patented Feb. 25, 1896.



Witnesses  
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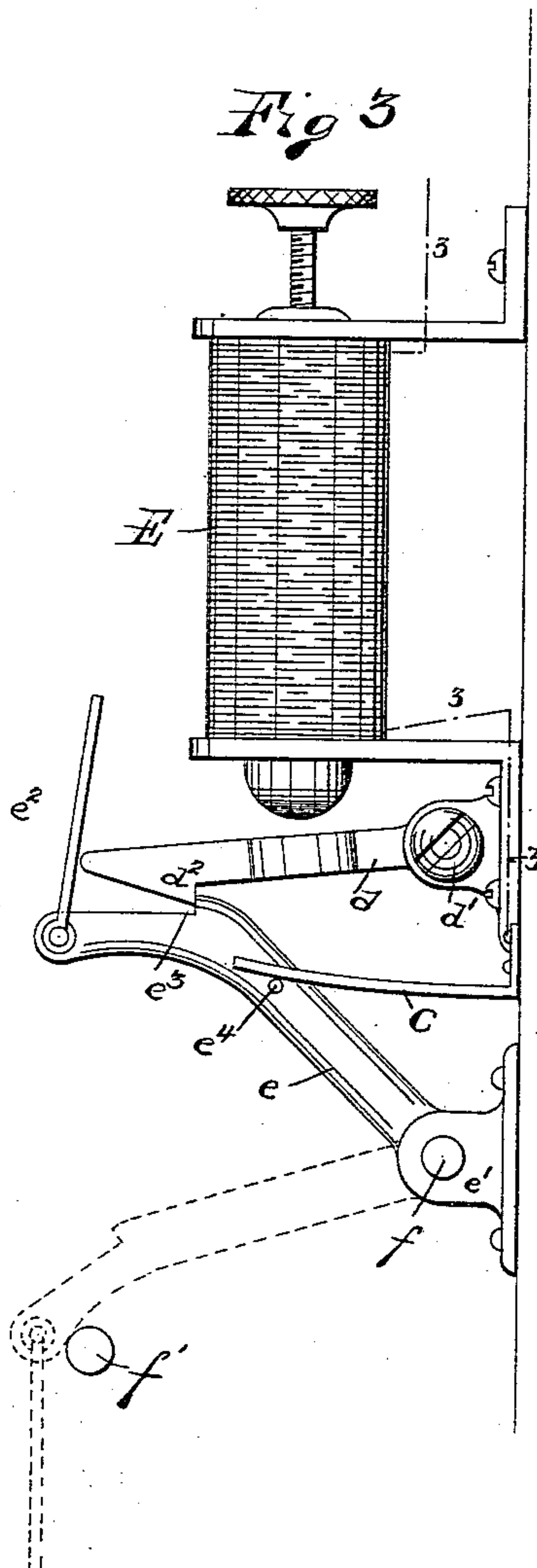
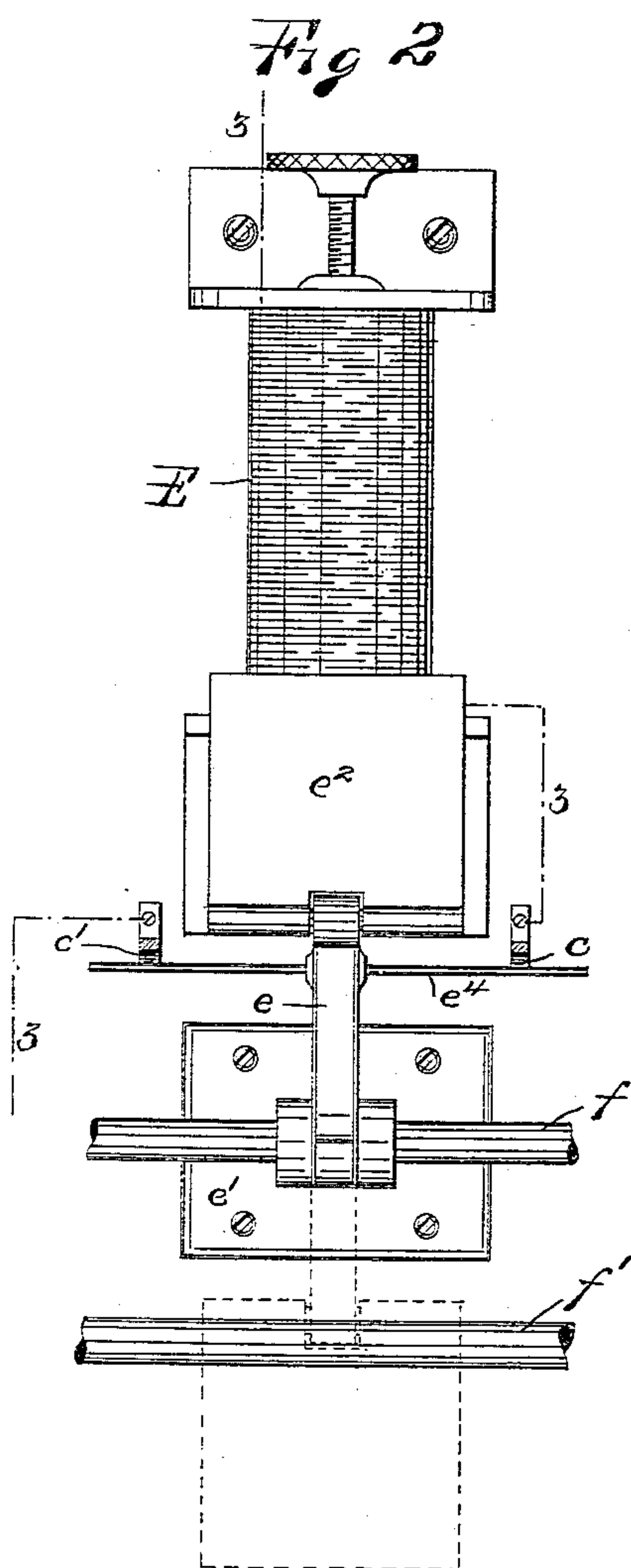
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# UNITED STATES PATENT OFFICE.

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## ELECTRIC DISTRIBUTION SYSTEM.

SPECIFICATION forming part of Letters Patent No. 555,326, dated February 25, 1896.

Application filed May 23, 1893. Serial No. 475,198. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE C. MYRICK, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Electric Distribution Systems; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

As is well known, in the installation of a system of electric lights or other translating devices there is included in the system of wiring one or more fuse-boxes provided with fuse-wires forming parts of the circuit, said fuse-wires being adapted to carry the normal current, but being of a character to be burned out or melted by a current above the normal tension, whereby the circuit will be broken in case of an excess of current. When a fuse burns out, a new one requires to be inserted in its place to re-establish the circuit, and it is usually desirable that this should be done with as little delay as possible.

The object of the present invention is to automatically announce in the dynamo-room or at any other desired point when a fuse has burned out and to indicate the location of the fuse-box in which a fuse has thus burned out, or the circuit in which such fuse is contained, and also, when desired, to automatically sound an alarm to call attention to what has happened.

To that end the invention consists primarily in the combination, with an electric circuit containing one or more lamps or other translating devices, of a shunt-circuit for the passage of the current upon the breaking of the main circuit, an annunciator arranged to be operated by the passage of a current through said shunt-circuit, and means for breaking said shunt-circuit when said annunciator has been operated.

The invention further consists in the combination, with an electric circuit containing one or more lamps or other translating devices, of a shunt-circuit for the passage of the current upon the breaking of the main circuit, an annunciator arranged to be operated by the passage of a current through said shunt-circuit, means for breaking said shunt-circuit when said annunciator has been op-

erated, an auxiliary battery-circuit arranged to be closed by the operation of said annunciator, and a bell or other alarm operated by said battery-circuit.

The invention further consists in certain other features to be hereinafter described.

Referring to the drawings, Figure 1 is a diagrammatic view representing the arrangement of the parts, and Figs. 2 and 3 are enlarged detail views showing the construction of the annunciator mechanism and the method of closing the auxiliary battery-circuit.

From the dynamo A or other generator extend the main circuit-wires 1 1, from which extend the branch circuit-wires 2 2 to supply one or more series of lamps or other translating devices *a*.

Referring first to that portion of the arrangement shown at the left of Fig. 1, and in which a single series of lamps or other translating devices is supplied directly by the branch wires 2 2, there is arranged in the circuit a fuse-box *b*, as usual, provided with the fuse-wires *b' b'*, forming parts of the circuit. Extending around the fuse-box, and with its terminals connected with the positive wire of the circuit, is a shunt-circuit 3 3, composed of smaller wire than the main and branch circuits 1 1 and 2 2, and so as to be of greater resistance. One of the wires of this shunt-circuit 3 3 is wound around the spool of an electromagnet E and is connected to the contact-spring *c*. The other wire of said shunt-circuit is connected to a corresponding contact-spring *c'*. The armature *d* of the electromagnet E is in the form of a hook-lever pivoted at *d'* to one of the brackets which supports the electromagnet or to any other suitable support.

*e* is another pivoted lever pivoted at *f* to a suitable bracket or support *e'*, and carrying at its free end a pivoted or swinging annunciator-drop *e<sup>2</sup>*, bearing a suitable number or other indication of the circuit with which it is connected. The pivoted lever *e* is provided with a notch *e<sup>3</sup>*, adapted to be engaged by the hook *d<sup>2</sup>* of the armature-lever *d*, as shown in Fig. 3. The pivoted lever *e* also carries a cross-bar *e<sup>4</sup>*, of metal or other suitable conducting material, said cross-bar being arranged to be brought in contact with the contact-springs *c c'* when the lever *e* is raised and



its notch engaged by the hook of the armature-lever, as shown in Fig. 3, said cross-bar  $e^4$  thus serving to complete the shunt-circuit 3 3.

The operation of the parts above described will be readily understood. As long as the fuse-wires  $b'$  in the fuse-box  $b$  remain intact the current will flow through the wires 1 1 2 2 and to and through the lamps or other translating devices  $a$ , and there will be no effective current through the shunt-circuit 3 3 by reason of the greater resistance of said circuit. Whenever the positive fuse  $b'$  (which positive fuse will always be the first to be burned) is burned out, however, thereby breaking the lamp-circuit, the current will then be forced to travel through the shunt-circuit 3 3, thereby energizing the electromagnet  $E$ , causing it to act upon its pivoted armature  $d$  and so as to withdraw its hook from the notch in the lever  $e$ , thereby releasing the latter and allowing said lever and the drop  $e^2$  to fall, the drop  $e^2$  in its fall turning upon its pivot so as to disclose the number or other indication of the circuit in which the fuse has burned out. The fall of the lever  $e$  removes the cross-bar  $e^4$  from contact with the springs  $c c'$ , thereby breaking the shunt-circuit and releasing the armature  $d$ . It will thus be observed that the passage of the current through the shunt-circuit immediately serves to break that circuit.

Ordinarily it will be desirable that an alarm should be sounded when a fuse burns out to call the attention of the attendant to the fact. For this purpose I have devised the following arrangement, whereby a bell or other suitable alarm will be sounded upon the falling of the annunciator-drop, as above described, through the operation of an auxiliary battery-circuit.

The pivot  $f$  of the drop-lever  $e$  is an elongated rod or bar of any desired length formed of metal or other conducting material. A second rod or bar  $f'$  is arranged parallel to the bar  $f$ , and both of these bars are connected with and form part of a battery-circuit, which includes the wires 4 4, and a battery  $B$ , and in which is arranged a bell or other alarm  $B'$ . As will be seen, when the drop-lever  $e$ , which for the purposes of this part of the invention should be of metal or other conducting material, is raised and engaged by the hooked armature  $d$  the battery-circuit above referred to will be open. When, however, said drop-lever is released and falls, it will rest against the bar  $f'$ , as indicated in dotted lines, Fig. 3, thereby connecting the bars  $f$  and  $f'$ , and thus closing the battery-circuit and causing the bell  $B'$  or other alarm to be sounded. The bell  $B'$  will of course continue to ring until the attendant resets the drop-lever  $e$  or breaks the connection by lifting said lever.

The annunciator and alarm may be located in any convenient or desired place—that is, they may be located in the same room with the fuse-box, or in the dynamo-room, or in any other desired location where the operation thereof may be observed by the person

whose duty it is to replace the burned-out fuse.

If desired, the arrangement above described may be applied to a number of circuits, a separate shunt-circuit being provided for each of said circuits, each of said shunt-circuits being connected with one and the same electromagnet and adapted to operate one and the same annunciator-drop. Such an arrangement is shown in the right-hand portion of Fig. 1. From the circuit-wires 2 2 in this portion of said figure extend three separate branch circuits 5 5, each provided with its separate fuse-box  $b$ , containing fuse-wires  $b'$ , and with its series of lamps or other translating devices  $a$ . One of the wires 3 of the shunt-circuit extends, as before, from the positive wire 1 of the main circuit, and is connected to the contact-spring  $c'$ . Separate wires 3 extend from each of the lamp-circuits, said three wires being all wound in parallel around the spool of one and the same electromagnet  $E$ , the end of each of said wires being then connected to a separate contact-spring  $c$ , all as shown in the left-hand portion of Fig. 1. The construction of the armature-lever and drop-lever with its cross-bar and drop is the same as before, the cross-bar  $e^4$  in this case connecting the contact-spring  $c$  with each and all of the contact-springs  $c'$ .

The operation of the arrangement last described is as follows: Suppose the positive fuse in any one of the three fuse-boxes is burned out, the current which before flowed through the lamp-circuit with which that fuse-box is connected will be caused to flow through the shunt-circuit connected with that particular lamp-circuit, thereby causing the electromagnet to be energized, the annunciator-drop to be released and the said shunt-circuit to be thereupon immediately broken, as before, and if an auxiliary battery-circuit and alarm be employed will likewise cause said battery-circuit to be closed and the alarm sounded in the same manner as before. The attendant will consequently be apprised that a fuse in one of the three fuse-boxes in the three lamp-circuits with which the annunciator-drop is connected has been burned out. The other two lamp-circuits will not be disturbed, and the current will continue to flow to those circuits, for the reason that the shunt-circuits connected with said lamp-circuits will continue to afford a greater resistance to the passage of the current than the lamp-circuits. In other words, when a fuse in one of the three fuse-boxes has been burned out, the current, which before had been divided between the three lamp-circuits, will then be divided between two of the lamp-circuits and the shunt-circuit connected with the third lamp-circuit, until by the release of the annunciator drop-lever such shunt-circuit is broken, as above described.

As shown in Fig. 1, the rods or bars  $f f'$



may be extended from one annunciator to the other, so that the falling of either drop will close the auxiliary battery-circuit and sound the alarm, and said bars may likewise be extended so as to communicate with any desired number of drops.

By the combination and arrangement of parts above described it will be seen that when a fuse in any given circuit, or in a given series of circuits, is burned out the circuit, or the series of circuits, will be indicated by the fall of the corresponding annunciator-drop, and the attendant will thereupon not only be immediately notified that a fuse has burned out, but will be informed as to the circuit or the series of circuits in which the accident has happened, and will thus be able to promptly locate and replace the burned-out fuse, thereby saving much time and inconvenience, which has been heretofore frequently experienced. With the alarm attachment the attention of the attendant will be called to what has occurred if he be absent from the room in which the annunciators are located, or if he did not happen to hear or observe the fall of the drop.

It is obvious that the arrangement above described may be employed to indicate or announce a break in the circuit due to any other cause than the burning out of a fuse.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an electric circuit containing one or more lamps or other translating devices, and a fuse-box, of a shunt-circuit extending around said fuse-box, an annunciator arranged to be operated by the passage of a current through said shunt-circuit, and means for breaking said shunt-circuit when said annunciator has been operated, substantially as described.

2. The combination, with an electric circuit containing one or more lamps or other translating devices, and a fuse-box provided with fuses forming parts of said circuit, of a shunt-circuit extending around said fuse-box, said shunt-circuit being of greater resistance than said first-named circuit, an annunciator connected with said shunt-circuit, said shunt-circuit being constructed to be broken by the operation of said annunciator, whereby as long as said fuses remain intact no effective current will pass through said shunt-circuit, but when one of said fuses is burned out a current will be caused to pass through said shunt-circuit to operate said annunciator, and when said annunciator has been operated said shunt-circuit will be broken, substantially as described.

3. The combination, with an electric circuit containing one or more lamps or other translating devices and a fuse-box, of a shunt-circuit extending around said fuse-box, an annunciator arranged to be operated by the passage of the current through said shunt-circuit, said shunt-circuit being constructed to be broken by the operation of said annun-

ciator, an auxiliary battery-circuit arranged to be closed by the operation of said annunciator, and a bell or other alarm operated by said battery-circuit, substantially as described.

4. The combination, with an electric circuit containing one or more lamps or other translating devices and a fuse-box, of a shunt-circuit extending around said fuse-box, a movable connection normally included in said shunt-circuit, an electromagnet the coil of which is included in said shunt-circuit, and the armature of which is arranged to operate said movable connection, whereby when the current is passed through said shunt-circuit the armature of said electromagnet will be actuated and the movable connection thereby operated to break said shunt-circuit, substantially as described.

5. The combination, with an electric circuit and an electromagnet the coil of which is included in said circuit, of an armature provided with a hook or other engaging device, a pivoted lever adapted to be engaged by said armature, and a normally-open auxiliary electric circuit including as a part thereof two parallel rods or bars, one of which constitutes the pivot of said pivoted lever, whereby when a current is passed through said first-named circuit the armature of said electromagnet will be actuated to release said pivoted lever and allow the free end thereof to fall and close said auxiliary circuit by making an electric connection between the two parallel bars of said circuit, substantially as described.

6. The combination with two or more electric circuits, of a shunt-circuit connected with each of said first-named circuits, said shunt-circuits being composed of separate wires for a portion of their length, but of only a single wire for the remainder of their length, an electromagnet around the spool of which the separate wires of said shunt-circuits are wound in parallel, a movable connection connecting the separate wires with the single wire of said shunt-circuits, said movable connection being arranged to be operated by the armature of said electromagnet, whereby when a current is passed through either of said shunt-circuits, the armature of said electromagnet will be actuated to operate said movable connection and thereby open all of said shunt-circuits, substantially as described.

7. The combination, with an electric circuit containing one or more lamps or other translating devices, of a shunt-circuit for the passage of the current upon the breaking of the main circuit, an annunciator arranged to be operated by the passage of a current through said shunt-circuit, and means for breaking said shunt-circuit when said annunciator has been operated, substantially as described.

8. The combination with an electric circuit containing one or more lamps or other translating devices, of a shunt-circuit for the passage of the current upon the breaking of the



main circuit, an annunciator arranged to be  
operated by the passage of a current through  
said shunt-circuit, means for breaking said  
shunt-circuit when said annunciator has been  
5 operated, an auxiliary battery - circuit ar-  
ranged to be closed by the operation of said  
annunciator, and a bell or other alarm oper-

ated by said battery-circuit, substantially as  
described.

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Witnesses:

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