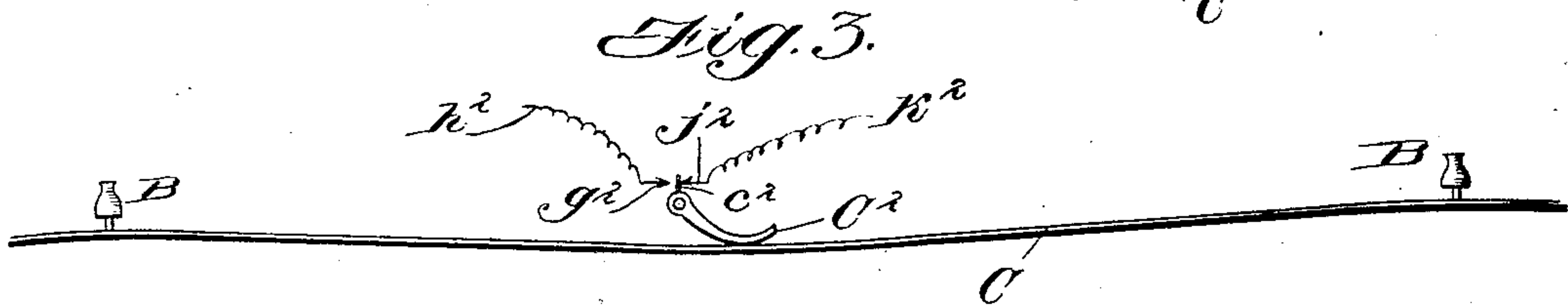
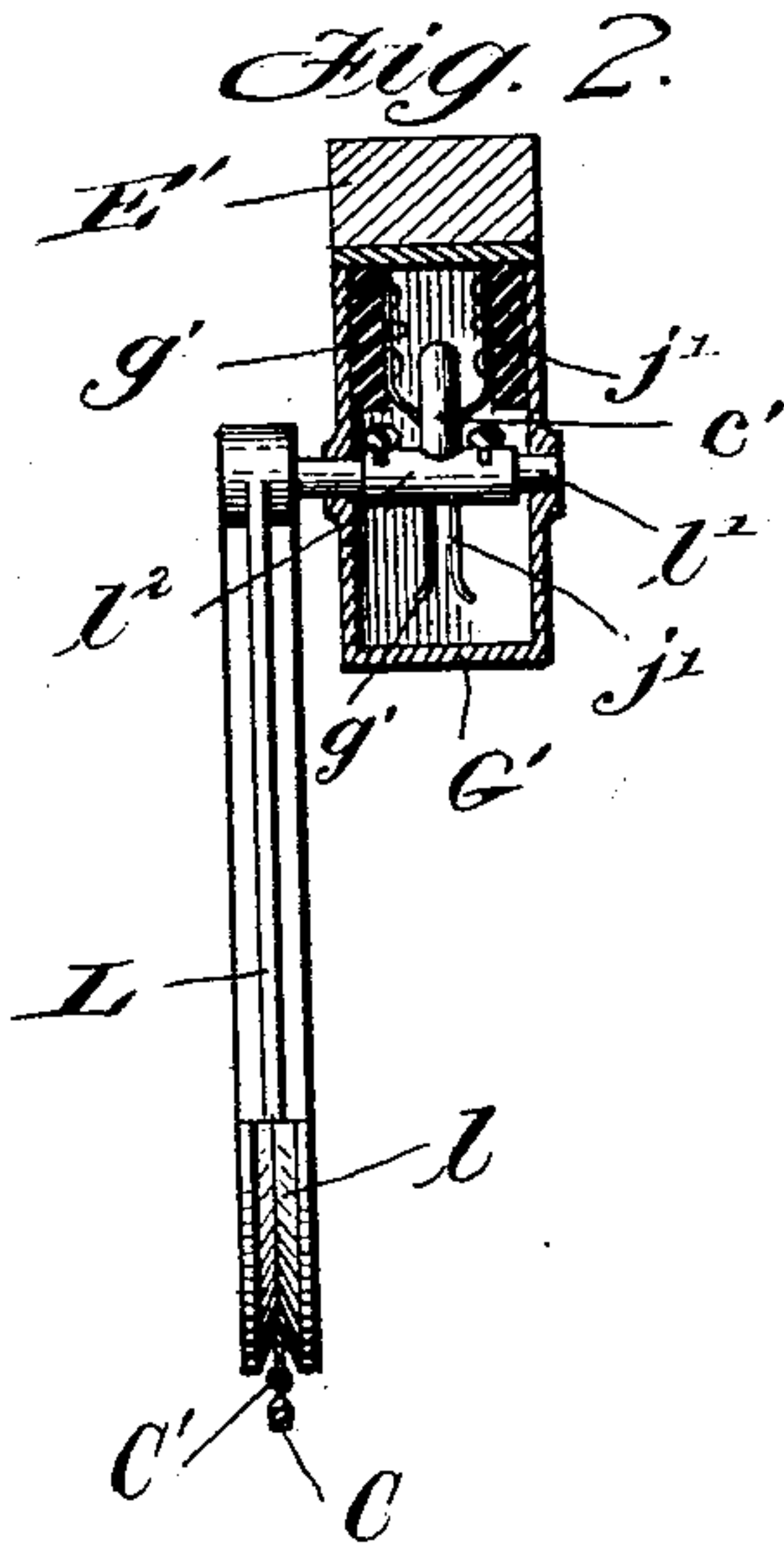
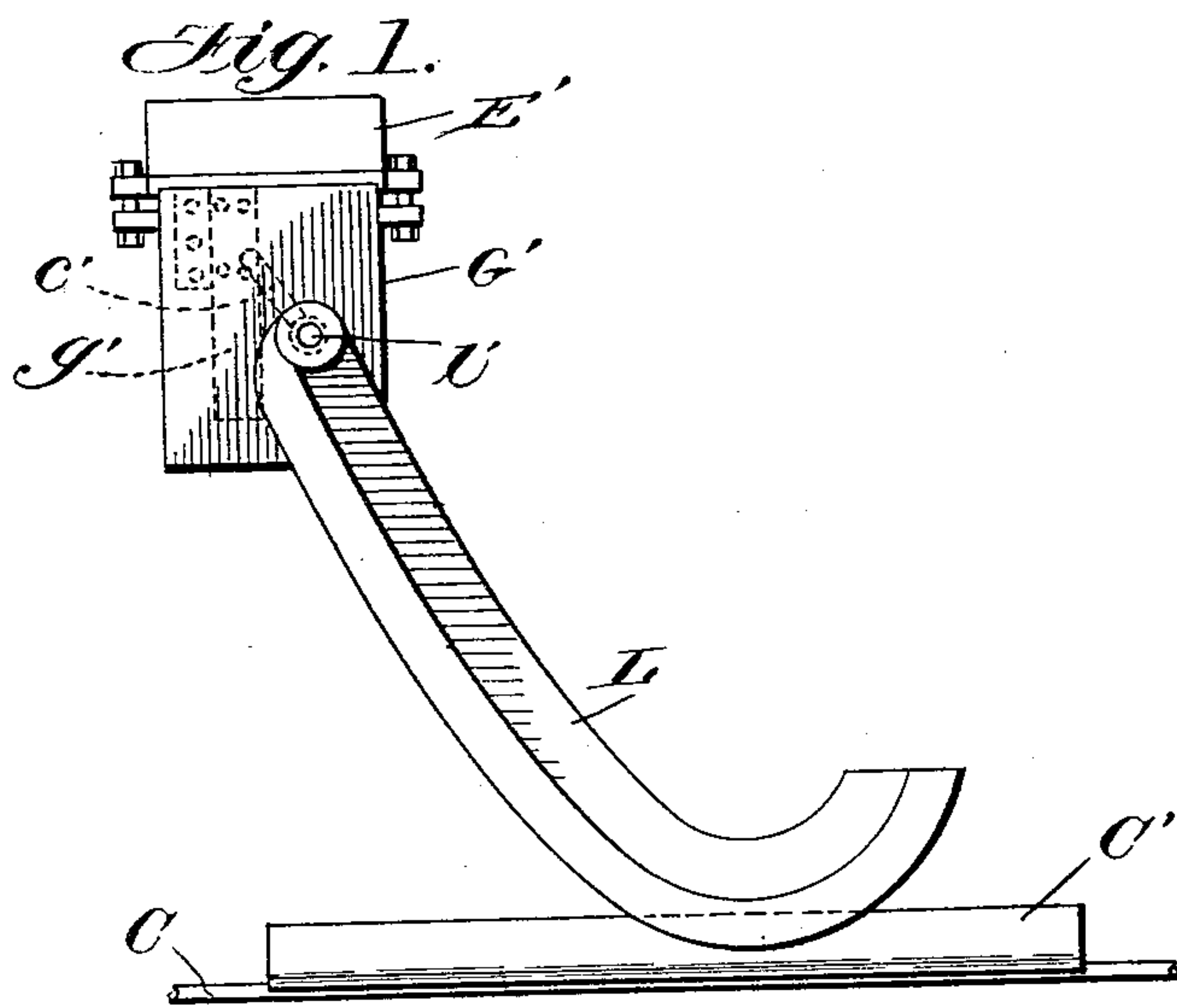


No. 703,022.

Patented June 24, 1902.

E. W. VOGEL.  
CIRCUIT CONTROLLER.  
(Application filed July 23, 1901.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

EUGENE W. VOGEL, OF CHICAGO, ILLINOIS.

## CIRCUIT-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 703,022, dated June 24, 1902.

Application filed July 23, 1901. Serial No. 69,376. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE W. VOGEL, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have  
5 invented a certain new and useful Improvement in Circuit-Controllers; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to circuit-controllers, and more particularly to that  
15 class of such devices which are automatically operated by an electrically-propelled car passing a given point.

It is customary in the operation of electric railways to provide circuits for actuating  
20 switches and signals and also for connecting and disconnecting the conductor with the source of current as the car approaches and recedes from the various sections into which the conductor is divided. Such circuits are  
25 automatically controlled either by the circuit being completed from the trolley through the car to the track, or by the trolley contacting with a circuit-controlling device located in the path of the trolley, or by the tread of a  
30 wheel of the car engaging a circuit-controlling means adjacent to one of the rails of the track. The several ways referred to of controlling a circuit by a passing car have proven unsatisfactory, the first because the circuit  
35 is not completed when the car is coasting, the second because the violent contact of the trolley with the stationary circuit-controlling device results in breaking or otherwise injuring the latter, and the third because the tread  
40 of the usual street-car wheel is not broad enough to overlap the rail and engage the circuit-controlling means.

The object of my invention is to provide a circuit-controller which will be automatically  
45 operated to make and break a circuit upon the passage of a car and which will avoid the objections above mentioned. In accomplishing this object I utilize the sag of the conductor, due to its weight between its supports, and the elevation of the conductor by  
50 the trolley of a passing car.

My invention will be more fully described

hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in several convenient and practical forms, and in which—

Figure 1 is an elevational view of an embodiment of my invention; Fig. 2, a transverse vertical section of Fig. 1; Fig. 3, a diagrammatic view of another embodiment of  
60 my invention, and Fig. 4 a diagrammatic view of still another modification of my invention.

Similar reference characters indicate corresponding parts in the several views of the drawings.

The embodiment of my invention illustrated in Figs. 1 and 2 comprises a support E', located above the conductor C, such support E' being secured to and thereby supporting a casing G', within which is located a circuit-  
70 controller. The casing G' may be secured to the support E' by any suitable means—such, for instance, as projecting lugs and bolts passing therethrough, as indicated in Fig. 1. A shaft l' is journaled in the casing G' and  
75 has a surrounding sleeve l<sup>2</sup> adjustably secured thereto within the casing G'. A movable contact c' projects radially from the sleeve l<sup>2</sup> and is adapted to engage and disengage fixed contacts g' and j', secured within  
80 the casing G' by any suitable means. The contacts g' and j' are insulated from the casing G', as indicated in Fig. 2, and form the terminals of one or two electric circuits, as desired. One end of the shaft l' projects  
85 through the casing and has secured thereto a depending arm L, which is adapted to engage a device C', projecting upwardly from the conductor C. The engagement between the arm L and the projecting device C' is rendered more positive by providing a guide-  
90 groove l in the under surface of the arm L, as clearly indicated in Figs. 1 and 2. In this embodiment of my invention the elevation of the conductor C due to the trolley of a passing car causes the lever L to rise, and thereby rock the shaft l', and with it the movable contact c'. The contact c' then engages the contacts g' and j' and completes the circuit or  
100 circuits connected therewith. When the conductor sags by its own weight, the arm L falls by gravity, and thereby rocks the shaft l', so that the movable contact c' is disengaged from the terminals g' and j'.



In Fig. 3 I have shown a modified form of my invention in which a lever  $C^2$  is pivotally supported in proximity to the conductor C, so as to be rocked about its pivot when the conductor C is elevated. A contact  $c^2$  is fixed to the lever  $C^2$ , so as to be rocked thereby. Fixed terminals  $g^2$  and  $j^2$  are located at either side of the movable contact  $c^2$  and are adapted to be alternately engaged by such movable contact as the lever  $C^2$  is elevated by the rise of the conductor when a trolley engages the same or as the lever swings downwardly with the conductor when disengaged from a trolley.  $h^2$  and  $k^2$  indicate leads connected to the terminals  $g^2$  and  $j^2$  and forming parts of circuits which are electrically connected to the conductor C through the movable contact  $c^2$  and the actuating-lever  $C^2$ .

Fig. 4 represents still another modified form of my invention in which a lever  $C^4$  is pivotally supported above the conductor C and is adapted to be swung upwardly and downwardly as the conductor is elevated by a trolley or is depressed by its own weight when the trolley has passed.  $g^4$  indicates a movable contact pivotally supported in position to be engaged by the lever  $C^4$ .  $j^4$  is a fixed terminal electrically connected with a lead  $k^4$ . M indicates a pivoted latch which is adapted to engage the end of the pivoted contact  $g^4$  when the latter is elevated through the engagement therewith of the lever  $C^4$  when the conductor C is elevated. M' indicates a magnet supported adjacent to the latch M, so that the latch M will be attracted by the magnet when the latter is energized by means of a circuit the terminals of which are indicated at  $m$   $m'$ .  $h^4$  indicates a lead connected with the movable contact  $g^4$  and forming part of a circuit including a source of energy—as, for instance, a battery—and also including any desired form of translating device. The operation of this embodiment of my invention is as follows: When a car passes beneath the circuit-controller, the lever  $C^4$  is elevated by the engagement of the trolley with the conductor C. The elevation of the lever  $C^4$  causes it to engage and raise the movable contact  $g^4$  into engagement with the fixed terminal  $j^4$ , such engagement being continued by means of the latch M engaging the end of the contact  $g^4$ . The circuit connected with the leads  $h^4$  and  $k^4$  is consequently closed through the movable contact  $g^4$  and the fixed terminal  $j^4$ . This circuit may be broken by closing the circuit which controls the energization of the magnet M', whereby the latch M is attracted and disengaged from the pivoted contact  $g^4$ , which is then permitted to fall from its engagement with the terminal  $j^4$ .

From the foregoing description of the sev-

eral embodiments of my invention it is evident that I have invented a circuit-controller comprising a fixed contact and a movable contact which is swung into and out of engagement with the fixed contact by the rise and fall of a conductor due, respectively, to the passing of a trolley and to the sag of the conductor between its points of support.

While I have described more or less precisely the details of the several constructions, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of my invention.

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

1. The combination with a conductor, of a circuit having a fixed terminal supported adjacent to said conductor, and a movable terminal pivotally supported between said fixed terminal and the conductor, and adapted to be lifted into contact with said fixed terminal by the elevation of said conductor, substantially as described.

2. The combination with a conductor, of a trolley adapted to engage said conductor, a circuit having its terminals supported in proximity to said conductor, a device pivotally supported in proximity to said terminals for electrically connecting the same, and means for actuating said device operated by the rise and fall of the conductor, substantially as described.

3. The combination with a conductor, of a circuit-controller supported in proximity to said conductor and adapted to be operated by the rise and fall thereof, said controller comprising a fixed contact and a movable contact, the latter supported upon a rock-shaft, said rock-shaft having an arm fixed thereto and engaging said conductor, substantially as described.

4. The combination with a conductor, of a controller-box supported in proximity to said conductor, a rock-shaft mounted within said box, a contact-finger projecting from said shaft, fixed contact located within said box and extending into the path of said contact-finger, an arm rigidly secured to the end of said rock-shaft and actuated by the rise and fall of said conductor, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

EUGENE W. VOGEL.

Witnesses:

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