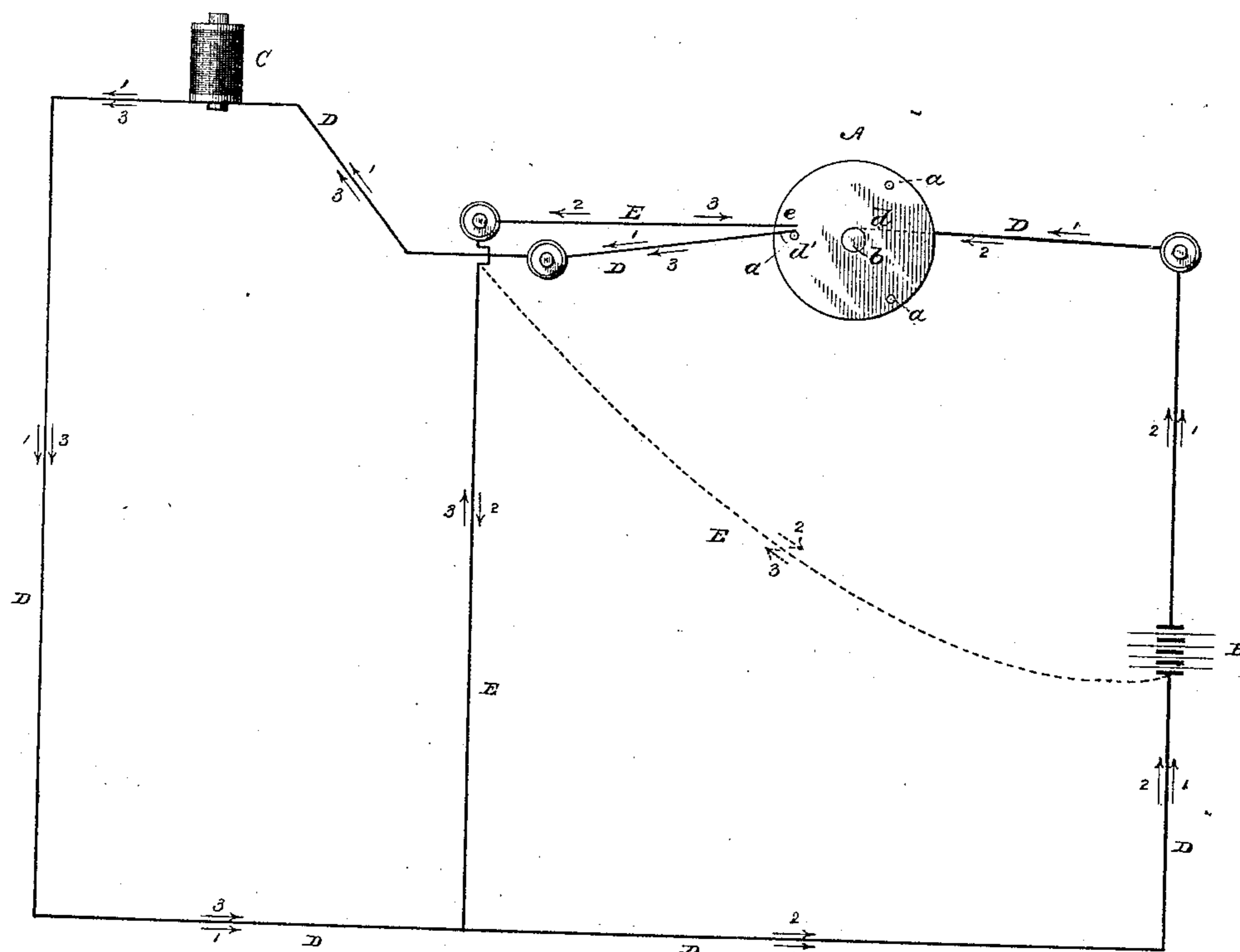


(No Model.)

L. H. SPELLIER.  
SPARKLESS CIRCUIT BREAKER.

No. 322,494.

Patented July 21, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

LOUIS H. SPELLIER, OF PHILADELPHIA, PENNSYLVANIA.

## SPARKLESS CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 322,494, dated July 21, 1885.

Application filed January 9, 1884. Renewed November 20, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS H. SPELLIER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Sparkless Circuit-Breakers, of which the following is a specification.

My invention relates to means for preventing a spark upon the interruption of an electro-magnetic circuit.

It is a well-known fact that when an electric current in a conductor turned upon itself is interrupted an extra current appears, which is rapidly discharged at a point of interruption with conversion of its energy into light and heat, and the consequent production of a spark, which is more or less destructive, according to the tension of the current. To prevent this spark, therefore, it is necessary to supply means for preventing the extra current from thus manifesting itself.

The object of my invention is to supply these means in a simple and effective form, and thus produce a circuit-breaker in which any spark from the extra current is obviated, that shall at once be of simple construction, and practically applicable to useful purposes.

Heretofore it has been proposed to prevent the excessive spark which occurs at the machine when the current of a dynamo-electric apparatus is suddenly interrupted by forming a short circuit around the field-of-force magnets when the switch is turned for the purpose of cutting off the current through the main circuit, thus robbing the field-of-force magnets of the current which energizes them, and materially decreasing the strength of the current generated, while at the same time the flow to the line is diverted into the short circuit; but in such case there is no carrying off of any extra current, there being a mere stoppage of the source of generation, and the influence of the spark to be obviated is not at the point of interruption in a supplied line or system, but at the supplying part—viz., at the machine or battery—and is not even there absolutely prevented; and, besides, the invention is in the field of magneto-electricity, not in that of electro-magnetism. Even in the field of electro-magnetism, however, and in the course of the supplied line, where there

is a rotatory circuit-breaker, it has been proposed to prevent the spark; but in such case the result is to be achieved by interposition of resistance to effect diffusion.

It has also been proposed to prevent a spark in the course of the supplied line where there are key circuit-breakers by short-circuiting just before completion of the long or main circuit, then disconnecting the short circuit to let the current flow through the long or main circuit and again short-circuiting for a moment just at the time of interruption of the long or main circuit; but in such case there is no rotatory or circularly moving device effecting the make and break, and there are, in fact, two separate short-circuitings—namely, a short-circuiting at the make, as well as one at the break.

My invention consists in the combination, with a device capable of rotatory or circular motion and placed in an electro-magnetic circuit, of a conductor connecting with a point of effluence upon such device at the moment of interruption of or break in the current of the line, and disconnecting therewith just after make in the current thereof, whereby there is but a single short-circuiting—namely, at the break.

In the accompanying drawing I have illustrated diagrammatically one means of carrying my invention into effect, like marks of reference referring to corresponding facts and parts.

The rotating device in this case is shown as a wheel or disk, A, which is in effect a commutator, and has as many electro-conductive projections or pins *a*, which may be placed either laterally or upon its circumference, as it is desired to have openings and closings of the circuit during the completion of one revolution. The device may be in the form of a circularly-swinging pendulum. It is obvious that instead of projections or pins the rotatory device may be supplied at intervals with insulating material.

B represents a suitable battery, and C represents an electro-magnet placed in the main circuit D. E represents a short circuit, which may either open into the main circuit beyond the electro-magnet or return directly to the battery. The axle of the commutator is represented by *b*.

*d*, *d'*, and *e* represent terminals of the bat-

tery,  $d$  and  $d'$  representing terminals of the  
 main line, while  $e$  represents a terminal of the  
 short circuit. It is intended in this case that  
 the terminal  $d$  shall rest upon or be electrically  
 5 connected with the axle, while  $d'$  is to make  
 contact with the pins or projections to com-  
 plete the main circuit. I prefer to have the  
 terminals in the form of springs. The ter-  
 minal  $d'$  being in contact with a pin, completes  
 10 the main circuit, and the current takes the  
 course shown by the arrows marked 1. The  
 terminal  $e$  is placed a little higher than the  
 terminal  $d'$ , and therefore does not touch the  
 pin  $a$  as the commutator A rotates until after  
 15 the pin has been an appreciable time in con-  
 tact with the terminal  $d'$ ; but as the commu-  
 tator continues to turn the terminal  $e$  will, a  
 moment before the terminal  $d'$  leaves the pin  
 or projection, also come into contact with it,  
 20 at which moment the terminal  $e$  will make a  
 short circuit through the conductor E, when  
 the course of the battery-current becomes that  
 indicated by the arrows marked 2; while the  
 induced current from the magnet, which ap-  
 25 pears at the moment the short circuit is made,  
 since this short circuit depletes the magnet,  
 takes the course indicated by the arrows  
 marked 3. A moment after the terminal  $d'$   
 leaves the pin or projection the terminal  $e$  fol-  
 30 lows it and the short circuit is also broken.

The fact that the sparks of the induced cur-  
 rent of electro-magnetic instruments will de-  
 stroy the contact-surfaces, by which the mak-  
 ing and breaking of the circuit is effected, is  
 35 very keenly felt in current-breakers for elec-  
 tro-magnetic time-telegraphs, and this has  
 been a great drawback to the adoption of such  
 means for transmitting time.

In practice I have found it convenient to  
 40 attach the rotatory device  $d$ , in the form of a  
 disk, to the escape-wheel of a clock, when it  
 will turn with such escape-wheel as a motor.

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

1. The combination, with a device capable  
 of rotatory or circular motion and placed in  
 an electro-magnetic circuit, of a conductor  
 connecting with a point of effluence upon such  
 device at the moment of interruption of or 50  
 break in the current of the line, and discon-  
 necting therewith just after the make of the  
 current thereof, substantially as and for the  
 purpose described.

2. A spark-arrester consisting of a commu- 55  
 tator rotating between a series of terminals of  
 an electric generator, two or more of which  
 terminals are arranged to have one electric-  
 ally-communicating contact-surface in com-  
 mon, in combination with two separate short 60  
 circuits, one for the electric generator and the  
 other connecting directly the wire terminals  
 of an electro-magnet to establish an unbroken  
 circuit for the induced current by keeping the  
 short circuit of the extra current closed, sub- 65  
 stantially as described.

3. The combination, with a generator of  
 electricity, B, of an electro-magnet, C, located  
 within the main circuit, a rotating circuit-  
 breaker located between the terminals of the 70  
 main circuit, and a short circuit, E, connected  
 with the generator at a point between the gen-  
 erator and the electro-magnet and having an  
 additional terminal,  $e$ , resting normally out of  
 contact with the main-circuit terminal and 75  
 adapted, as described, to close simultaneously  
 (by the action of the circuit-breaker) both a  
 short circuit for the generator and a circuit  
 for the extra current of the electro-magnet  
 just before the breakage of the main circuit,  
 and to retain the short circuits closed until the  
 main circuit is broken, as and for the purpose  
 described.

LOUIS H. SPELLIER.

Witnesses:

ALFRED FACKENTHALL,  
 ANNIE M. FACKENTHALL.