

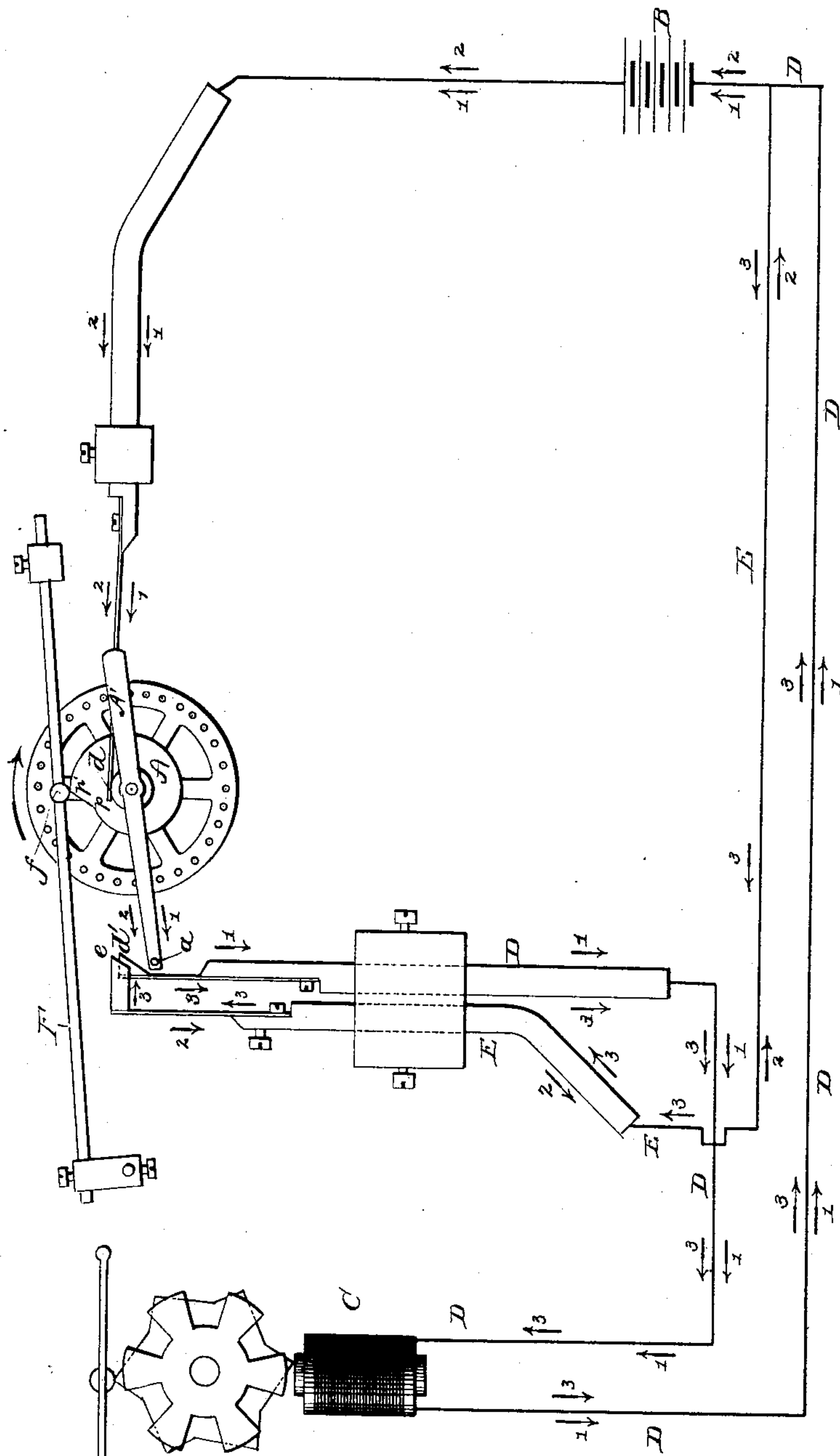
(No Model.)

L. H. SPELLIER.

CONTACT MAKER FOR ELECTRIC CLOCKS.

No. 330,632.

Patented Nov. 17, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

LOUIS H. SPELLIER, OF PHILADELPHIA, PENNSYLVANIA.

## CONTACT-MAKER FOR ELECTRIC CLOCKS.

SPECIFICATION forming part of Letters Patent No. 330,632, dated November 17, 1885.

Application filed September 19, 1885. Serial No. 177,618. (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 certain new and useful Improvements in Contact-Makers for Electric Clocks; and I do hereby 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 appertains to make and use the same.

My invention relates to electric clocks. Heretofore the escapement-wheel of a clock, when used for the making and breaking of an electric circuit to actuate secondary electric dials, has not at the moment of the make and break exercised any more force while operating the circuit-closer than while serving its original purpose alone—namely, that of giving to the oscillating pendulum of the clock the impulses needed for the continuation of its movement. The power necessary for such impulses is very slight, and yet the escapement-wheel cannot be propelled with much surplus of power without damaging results to the good condition of the clock. Under ordinary circumstances, therefore, the escape-wheel cannot operate a circuit-breaker with sufficient energy to make a reliable contact for the passage of the electric current, and since the contact must be a firm one to insure such passage, frequent failure to form a complete electric circuit is a not uncommon consequence. This fact has greatly interfered with the reliability of secondary electric clocks and their more general introduction into use for public purposes.

The object of my invention is to overcome these difficulties and provide means and mechanism whereby perfect contact is assured.

My invention operates upon the principle of the inclined plane; and it consists in forming upon or providing the shaft or arbor of the escapement-wheel, or one of the other wheels of a clock-work, with a cam which is adapted to engage a weighted or spring or otherwise actuated roller, lug, or lever, the said cam being for a portion of its periphery made as an incline, upon which the weighted or otherwise actuated roller, lug, or lever will bear to cause the shaft to rotate with increased force, and in fitting also upon said shaft a contact-maker

so arranged that it will be making contact while the shaft is subjected to the increased force.

The accompanying drawing illustrates one way of carrying out my invention, and as it is applied to the escapement-wheel of a clock to actuate electric dials.

Upon an escapement-wheel, which is mounted upon the usual shaft or arbor, is secured the cam A, the periphery of which is made in the form of a curve, which from the point *p* toward the point *p'*, around the greater portion of the cam, gradually leaves the center of the axle, the point *p* being nearest the center and the point *p'* being farthest therefrom. As shown, the shorter portion of the periphery of the cam between the points *p* and *p'* is made as a straight incline. Upon the shaft is also secured an arm or bar, A', which has at one end a pin, *a*. Suitably pivoted in the frame of the clock is a weighted or spring-pressed arm or lever, F, which, as shown, may be adjustably placed or weighted. This arm F carries a roller, *f*, which bears against the cam A. Wires D E of an electric circuit have their ends fitted with springs *d' e*, which are so arranged as to be normally separated electrically. These springs are so located that they will lie in the path of the pin *a* of the arm A', or of the end of the arm itself, as desired, or of a pin on the escape-wheel or cam, so that when they are both touched thereby they will be connected electrically, and thus close the circuit.

B represents a suitable battery, and C an electro-magnet placed in the main circuit D.

E represents a short circuit.

*d*, *d'*, and *e* are the terminals of the battery, *d* and *d'* being terminals of the main line, while *e* is a terminal of the short circuit. It is intended that the terminal *d* shall rest upon or be electrically connected with the arbor, while *d'* is to make contact with the pins or projections to complete the main circuit. The terminals are in the form of springs. The terminal *d'*, being in contact with a pin, completes the main circuit, and the current takes the course shown by the arrows marked 1. The terminal *e* is placed a little higher than or beyond the terminal *d'*, and therefore does not touch the pin *a* as the commutator A rotates until after the pin has been an appreciable



time in contact with the terminal  $d'$ ; but as the bar continues to move the terminal  $e$  will, a moment before the terminal  $d'$  leaves the pin or projection, also come into contact with it, 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 appears 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  $e$  follows it, and the short circuit is also broken, and thus to my present invention is adapted a sparkless circuit-breaker.

The operation of the mechanism for turning the shaft with increased force at any desirable point or points will be as follows: As the escapement-wheel on its shaft revolves it turns with it the cam A and arm A'. Now, supposing the roller  $f$  were at the point  $p$ , or at that point which is nearest the center of the shaft, the escapement revolving in the direction of the arrow, the pin  $a$  will then have just passed the spring  $e$ , and the weighted arm will be gradually raised by means of its attached roller up until it reaches the point  $p'$ , (that most distant from the center of the shaft,) upon passing which the roller will act against the abrupt incline from  $p'$  to  $p$ , thus causing the shaft to turn with increased force. While the roller is bearing against the incline from  $p'$  to  $p$ , and the shaft revolving with greatest force, the pin  $a$  is bearing against one or both of the springs. When the roller again reaches the point  $p$ , the operation is repeated.

It will thus be seen that by my invention

surplus force in the shaft is gradually stored up and utilized at the proper moment to make electrical contact.

It is obvious that other means or devices may be substituted for those hereinbefore specifically described for making the contact, so I do not limit myself to the exact devices described. It is obvious, also, that two or more cam-edges with suitable inclined portions may be made upon a single disk, in order that the force with which the shaft shall turn may be increased more than once in one revolution. By this construction the force with which the shaft revolves may be increased as often as contacts are made.

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

1. The combination, with a shaft and a cam made with an incline for a portion of its periphery, against which a weighted spring or otherwise actuated roller, lug, or lever bears to impel the shaft with greater force, of means, substantially as described, for making and breaking an electric circuit, the shaft being impelled with greater force at the time of contact, as set forth.

2. The combination, with a shaft and a cam made with an incline for a portion of its periphery, against which a weighted or otherwise actuated roller, lug, or lever bears to impel the shaft with greater force at a particular time, of an arm adapted to make electrical contact, the said contact being made at the moment the shaft is impelled with greater force, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS H. SPELLIER.

Witnesses:

R. G. DYRENFORTH,  
W. W. MORTIMER.