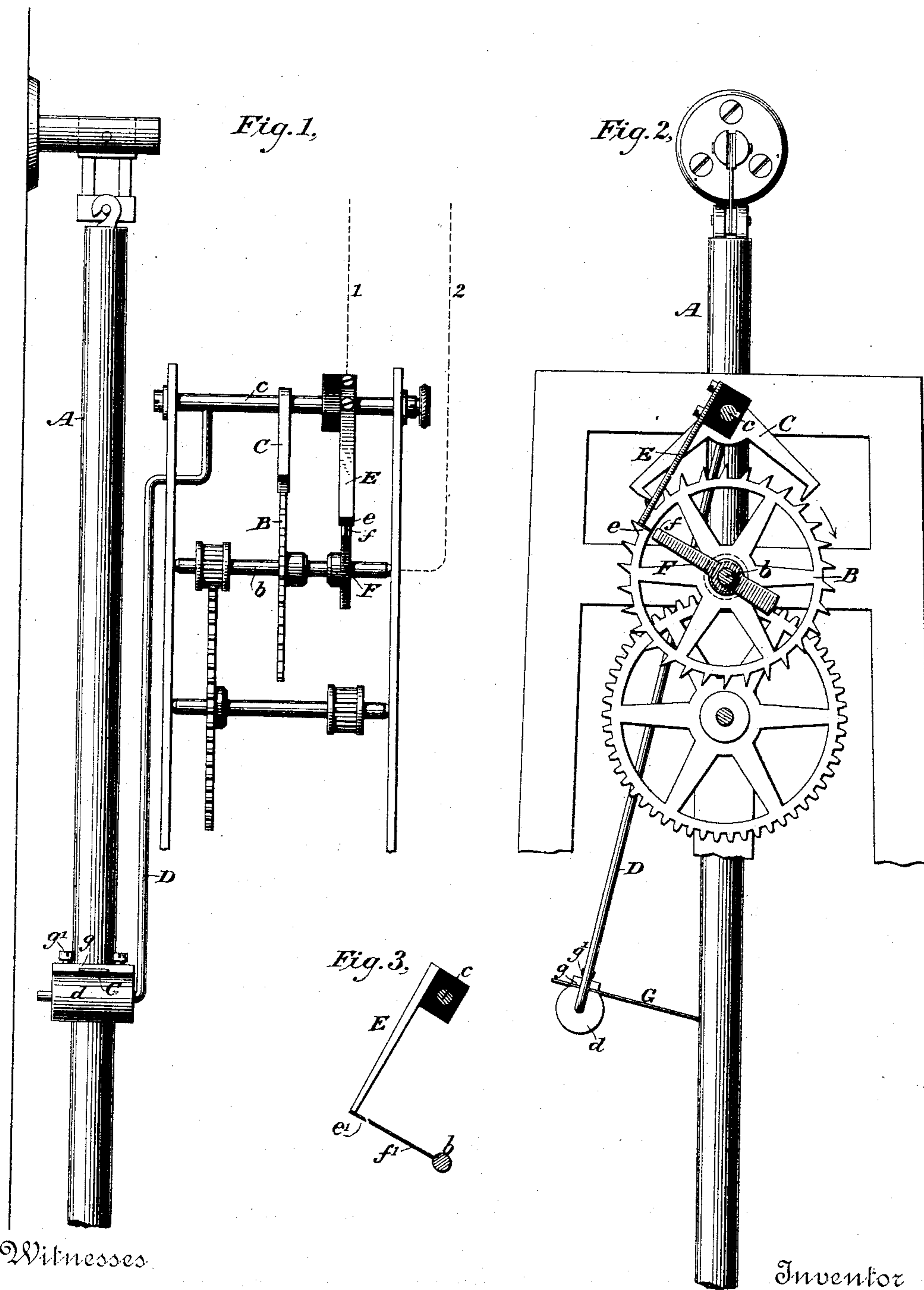


(No Model.)

C. H. POND.
CIRCUIT CLOSER FOR ELECTRIC CLOCKS.

No. 338,773.

Patented Mar. 30, 1886.



Witnesses

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UNITED STATES PATENT OFFICE.

CHESTER H. POND, OF BROOKLYN, NEW YORK.

CIRCUIT-CLOSER FOR ELECTRIC CLOCKS.

SPECIFICATION forming part of Letters Patent No. 333,773, dated March 30, 1886.

Application filed June 6, 1885. Serial No. 167,854. (No model.)

To all whom it may concern:

Be it known that I, CHESTER H. POND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Circuit-Closers for Electric Clocks, of which the following is a specification.

The invention relates to the class of devices employed for periodically completing the connection of an electric circuit by the operation of a clock mechanism.

The object of the invention is to provide reliable means for completing the connections of a circuit once each minute or at other predetermined intervals, which device shall be operated without impairing the time-keeping qualities of the regulator to which it is applied.

In general terms the invention may be described as follows: In place of the usual form of crutch applied to the pendulum of a regulator a weighted arm is employed, this arm being attached to the escapement-anchor in the same manner as the crutch. The weighted arm is provided with a flexible spring, which presses against one side of the pendulum-rod. It is by reason of the successive impulses given to the pendulum through this spring that the vibration of the pendulum is maintained. The spring rests constantly at a given point against the pendulum-rod, and the changes of the relative positions of the pendulum-rod and weighted lever are compensated for by the bending of the spring, so that no friction is produced between the two parts. Upon the arbor of the escapement-anchor is carried an insulated arm, carrying at its extremity a knife-edge contact. Upon the arbor of the scape-wheel there is carried an arm, which also is provided with a knife-edge contact, lying in a plane at right angles to that of the first-named contact. The revolution of the scape-wheel periodically places the contact moving therewith in position to intercept the path of the contact moving with the escapement-anchor. The parts are so adjusted that the two points or contacts will be brought against each other immediately before the

completion of the movement of the weighted lever in the direction of the pendulum, so that a very short contact will be made between the points. The return movement of the pendulum will again separate the points. The failure of the impulse-lever to complete its full movement once each time the circuit is thus completed will not in the slightest degree affect or impair the time-keeping qualities of the clock.

In the accompanying drawings, Figure 1 is a side elevation, and Fig. 2 is a front view, of such parts of a clock mechanism as are required to illustrate the invention. Fig. 3 illustrates a modification.

Referring to the drawings, A represents a clock-pendulum, which is suspended in any convenient manner. The scape-wheel B is driven in the direction indicated by the arrow by means of a spring or weight in a manner well understood. The movements of the scape-wheel are controlled by an anchor, C. The anchor is carried upon an arbor, *c*, which also carries a weighted arm or impulse-lever, D. The lower end of the arm D is provided with a weight, *d*. A spring, G, is secured to the weight *d* or the arm D by means of a suitable clamp or plate, *g*, which is secured to the weight by screws *g'*. The position of the spring G may be adjusted laterally between the screws *g'*. The end of the spring G rests against the pendulum-rod, and when, by the movement of the scape-wheel, the impulse-lever D moves toward the right hand, Fig. 2, it will exert a pressure upon the pendulum-rod, tending to cause it to swing toward the right hand. After the pendulum has completed its normal vibration toward the right hand the scape-wheel and anchor will be in such relative positions that the former will tend to vibrate the anchor in the opposite direction, thereby relieving the pendulum of the pressure caused by the weight *d* exerted through the spring G. In this manner the vibration of the pendulum is maintained. The point at which the end of the spring rests against the pendulum-rod is not changed, owing to the resilience of the spring, which bends slightly as the relative positions of the

rod and the impulse-arm change, thus avoiding the friction which is incident to the employment of a crutch. This portion of the apparatus, however, is not in itself new.

5 Upon the arbor *c* of the escapement-anchor there is carried an insulated arm, *E*. At the extremity of the arm there is carried a knife-edge contact, *e*. This contact is carried toward and away from the arbor *b* of the scape-wheel at each vibration of the pendulum-rod or of the escapement-anchor. Upon the arbor *b* there is carried an arm, *F*, which carries at its extremity a knife-edge contact, *f*. The revolution of the scape-wheel causes the contact *f* to be placed in the path of the contact *e* once a minute. The swing of the arm *E* places the point *e* against the point *f*. The duration of the contact, however, may be very short. The next succeeding movement of the point *e* toward the right hand will be uninterrupted, as the point *f* will have been carried out of its path. A strong and reliable contact will be made by the impingement of the two points, by reason of the weight *d*. Immediately after the interception of the point *e* by the point *f* the pendulum-rod will move away from the spring *G* and the point *e* will rest against the point *f* with all the pressure due to the weight acting through a long leverage.

The knife-edge contact *f* is represented as lying in the plane of its revolution. It is evident, however, that it might be placed at right angles to this and the plane of the contact *e* changed to correspond.

It is designed that conductors 1 and 2, leading from a battery through any suitable system of electric clocks or other devices, shall be respectively connected with the points *e* and *f* in any suitable manner.

Instead of two knife-edge contacts, *e* and *f*, crossing each other at an angle—the forms of contacts shown in Figs. 1 and 2—one of the contacts may be yielding, as shown at *f'* in Fig. 3.

The contact *f'* consists of a flexible spring secured to the arbor *b* in any convenient manner, and constructed to yield slightly when pressed by the contact *e'*. The contact *f'* is preferably beveled upon the rear surface, so that the downward movement of the arm *e'* will tend to bend the spring forward, and at the same time permit of a rubbing-contact, which keeps the points bright. This construction permits the contact *e'* to continue to advance, and it is therefore evident that it may be applied to a crutch, such as is usually employed in connection with pendulums.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with a pendulum-rod and a weighted impulse-lever, of a scape-wheel, an escapement-anchor applied thereto, and controlling the movements of said impulse-lever, a contact-point vibrating with said es-

capement-anchor, and a second contact-point periodically placed in the path of the first-named contact-point, substantially as described.

2. The combination, substantially as hereinbefore set forth, with a clock-pendulum and an impulse-rod applied thereto, of a scape-wheel, an escapement-anchor, a contact-point moving with said anchor, a second contact-point moving with said scape-wheel and periodically placed thereby in the path of the first-named point, substantially as described.

3. The combination, substantially as hereinbefore set forth, with a pendulum-rod, a scape-wheel, and an escapement-anchor, of an impulse-arm, a spring secured to said arm and normally pressing against said pendulum-rod, a contact-point moving with said impulse-arm, and a second contact-point periodically placed in the path of the first-named point, thereby intercepting its movements and momentarily separating said impulse-spring from said pendulum-rod.

4. The combination, substantially as hereinbefore set forth, with a pendulum-rod, an impulse-arm, a scape-wheel, an escapement-anchor applied thereto and controlling the movements of said arm, and an impulse-spring intervening between said arm and rod, of a contact-point and means for placing the latter periodically in the path of the former during one vibration only of the said impulse-arm.

5. The combination, substantially as hereinbefore set forth, with a pendulum-rod, an impulse arm or lever, and an intervening spring, of a scape-wheel, an escapement-anchor applied thereto, an insulated knife-edge contact-point supported from the arbor of said escapement-anchor, a second knife-edge contact-point carried upon the arbor of said scape-wheel, the faces of which contacts intersect each other at an angle, and means substantially such as described for placing the one contact in the path of the other once each revolution of the scape-wheel.

6. The combination, substantially as hereinbefore set forth, with a clock-movement, of a circuit-closer, consisting of a vibrating knife-edge contact and a revolving knife-edge contact, the two having their faces in planes crossing each other, substantially as described.

7. The combination, substantially as hereinbefore set forth, with a clock-movement, of a circuit-closing point vibrating with the pendulum, and a second contact-point revolved by the clock-movement and periodically placed in the path of the first-named contact-point.

8. The combination, substantially as hereinbefore set forth, with a clock-movement, of a circuit-closing point vibrated thereby, and a yielding contact-arm revolving with one of the arbors of the movement and periodically

placed in the path of the vibrating-point, substantially as described.

9. The combination, substantially as hereinbefore set forth, with a clock-pendulum
5 and a scape-wheel, of a vibrating contact moving with the pendulum, and a yielding contact-arm having a beveled end revolving with the scape-wheel and periodically placed in the path of the vibrating contact.

In testimony whereof I have hereunto subscribed my name this 27th day of May, A. D. 1885.

CHESTER H. POND.

Witnesses:

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